

# Tracing the maceral origin in combustion chars. The inertinite in Combustion WG of ICCP.



## Report of the 2000 Round Robin exercise on CD optical microscopy images of coal chars

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### Participants:

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## Inertinite in Combustion WG Round Robin 2000

### Participants

Deolinda Flores (PT)  
Bruno Valentim (PT)  
Manuela Marques (PT)  
Ed Lester (UK)  
Dave Cliff (UK)  
Richelieu Barranco (UK)  
Henrik Petersen (DK)  
Magdalena Misz (PO)  
S. Pusz/B. Kwiecinska (PO)  
Diego Alvarez (ES)  
M. Jesús Alonso (ES)  
Lily B. Méndez (ES)  
Katia S. Milenkova (ES)  
Angeles G. Borrego (ES)

### INWG 2000 Exercise content

#### CD containing:

- \*Introductory presentation
- \*Exercise with images taken with partially crossed nicols
- \*Exercise with images taken with crossed nicols and retarder plate

# The 2000 Round Robin exercise of the Inertinite in Combustion W.G.

- A description of the classification system
- Some examples of the material to be grouped under each heading
- A summary of the results from 1999 Round Robin exercise (INCWG 99CD Borrego et al., 1999) indicating the level of agreement of each field identified.
- **Exc. 1.** With images taken in white light with partially crossed nicols
- **Exc. 2.** With images taken with crossed nicols using  $1 \lambda$  retarding plate
- Participants were asked to carry out the exercises with a time interval of at least one week.

## Classification system of Carbonaceous material in chars

**Group 1** would include all kind of domains which could derive from vitrinite, and these can be isotropic or anisotropic, depending on the rank of the coal.

**Group 2** would include the char materials which have been presumably formed from inertinites, but have been highly altered during pyrolysis, showing both anisotropic texture and an important porosity development ( $\rho > 50\%$ ).

**Group 3** would include those domains formed from inertinites which have developed an appreciable anisotropy without further porosity development ( $\rho < 50\%$ ).

Conversely, the **Group 4** materials would be those which have passed through a plastic stage and generated a porous structure ( $\rho > 50\%$ ) but do not show any signs of anisotropy.

**Group 5** would include the isotropic dense domains with evidence of having fused (i.e.: small spherical degassing pores) ( $\rho < 50\%$ ).

**Group 6** would include all the least altered inertinites not showing cellular structure. They will be mainly massive isotropic material without any sign of having passed through a plastic stage.

**Group 7** would only include the unchanged fusinites. They will be typically isotropic but might also exhibit wavy-like anisotropy.

VITRINITE			GROUP 1	
			POROUS	DENSE
INERTINITE	FUSED	ANISO	GROUP 2	GROUP 3
		ISO	GROUP 4	GROUP 5
	UNFUSED	MASSIVE	GROUP 6	
		FUSINOID	GROUP 7	

The parent coals of the chars from which images were taken in 2000 exercise are shown below

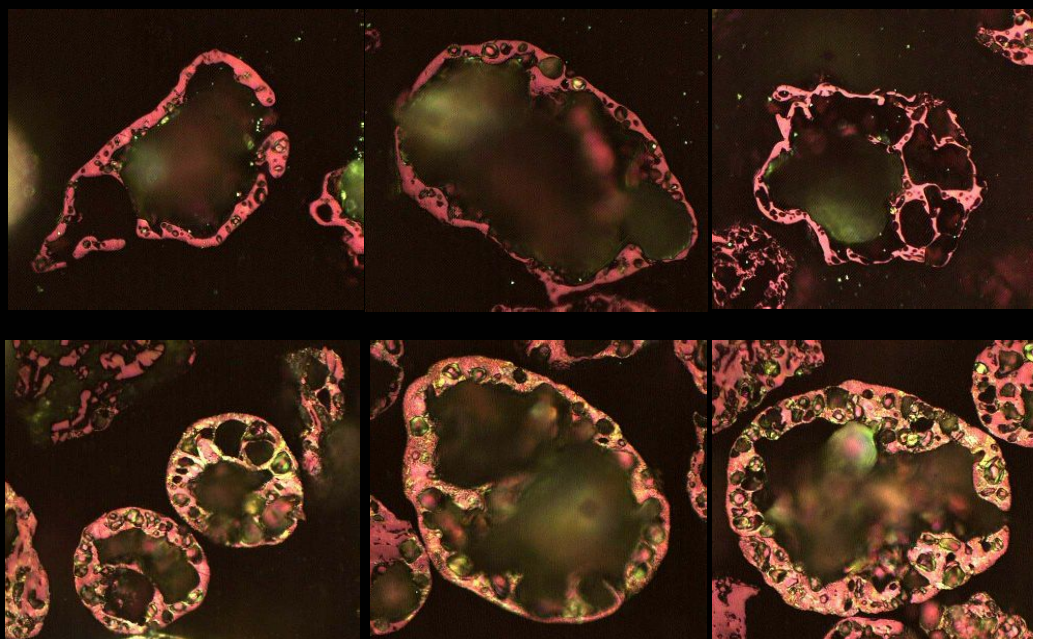
	A	B	C	D
Vitrinite	81.8	55.6	30.6	68.8
Inertinite	17.0	44.0	66.0	28.6
Liptinite	1.2	0.4	6.4	2.6
Rr (%)	0.61	1.07	0.68	0.56

## Aspect of vitrinite-derived material in the chars

Vitrinite  
-derived  
in coal A

50  $\mu$ m

Vitrinite  
-derived  
in coal B

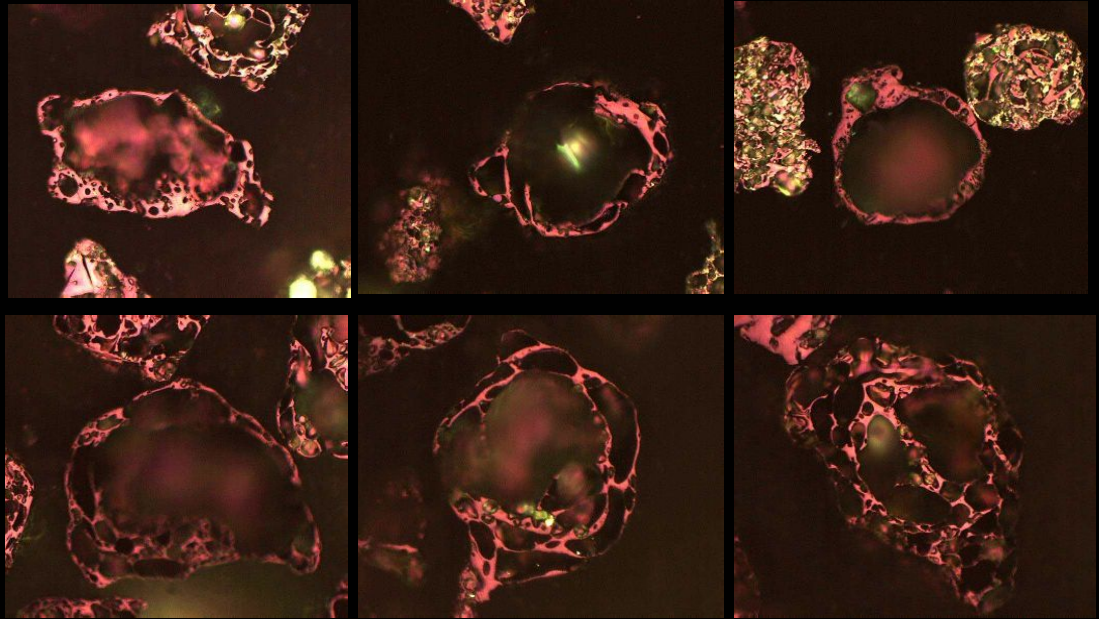


## Aspect of vitrinite-derived material in the chars

Vitrinite  
-derived  
in coal C

50  $\mu\text{m}$

Vitrinite  
-derived  
in coal D



## Results

The following slides contain the images classified in 2000 exercise. Both images taken with parallel and with crossed nicols are shown together.

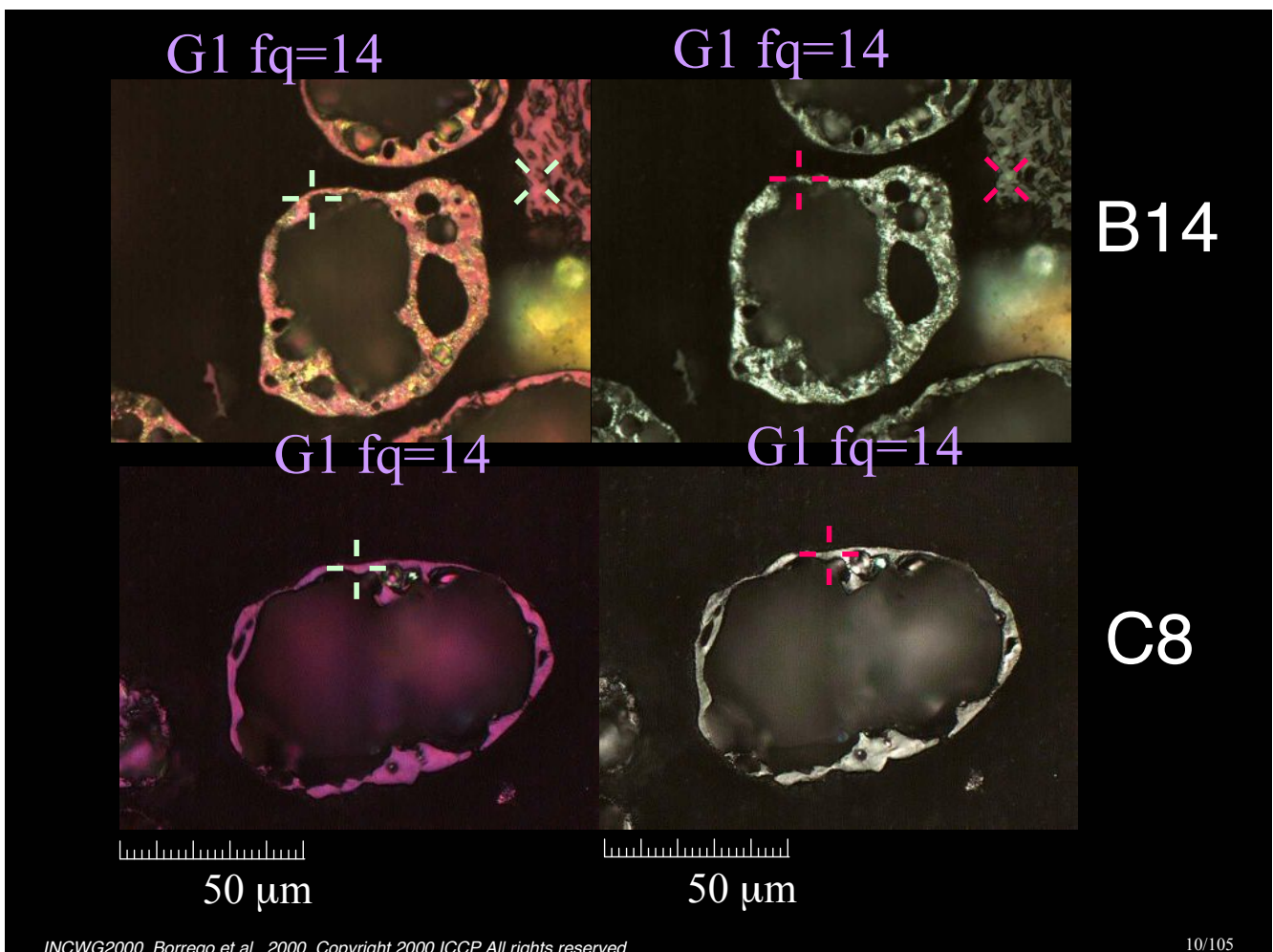
Images are ordered according to their level of agreement within each group class.

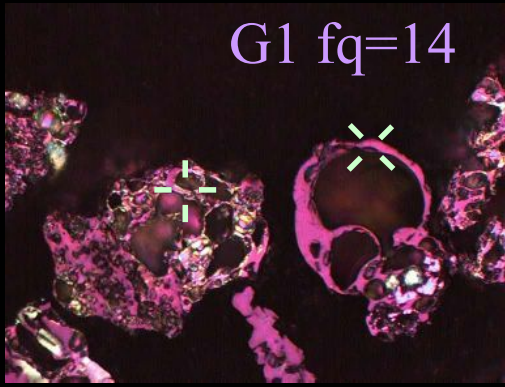
The images maintain the labels as in the 2000 year exercise. They do not necessarily correspond to the labels in the website exercise or in the CD because they were re-labelled for consistency. The equivalence between both labelling systems is available in the website ([image.labelling.xls](#)). The frequency (fq) refers to the number of participants who assigned that class to the field. Maximum frequency is 14

G1 Sure identification  
(Agreement higher than 79 %)

G1 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

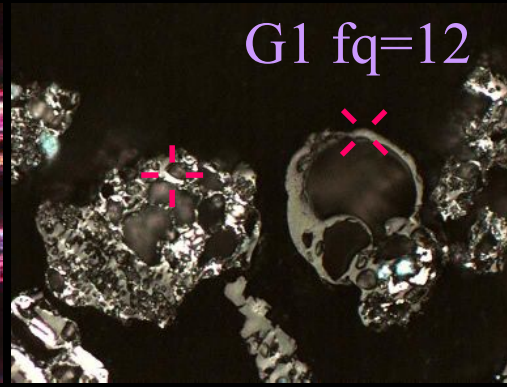
G1 Problems  
(2nd mode over 30%)





G1 fq=14

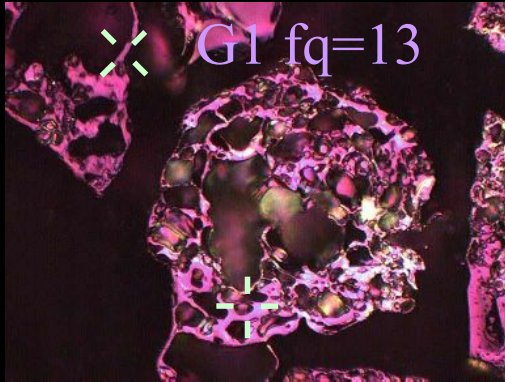
50  $\mu$ m



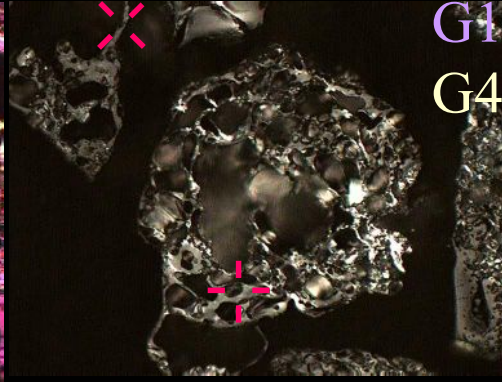
G1 fq=12

50  $\mu$ m

C15

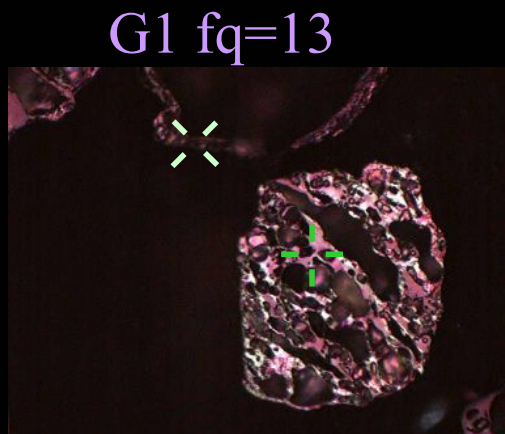


G1 fq=13

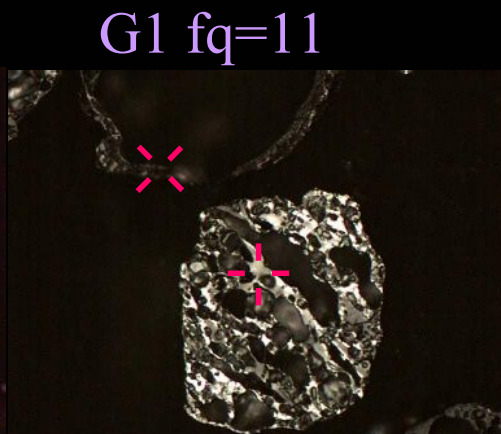


G1 fq=10  
G4

C12

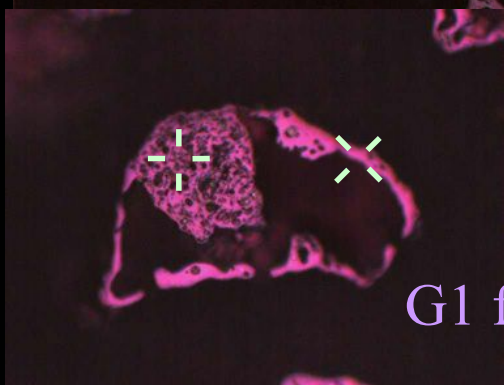


G1 fq=13

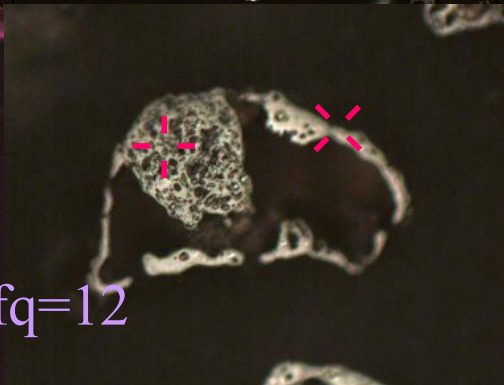


G1 fq=11

C36



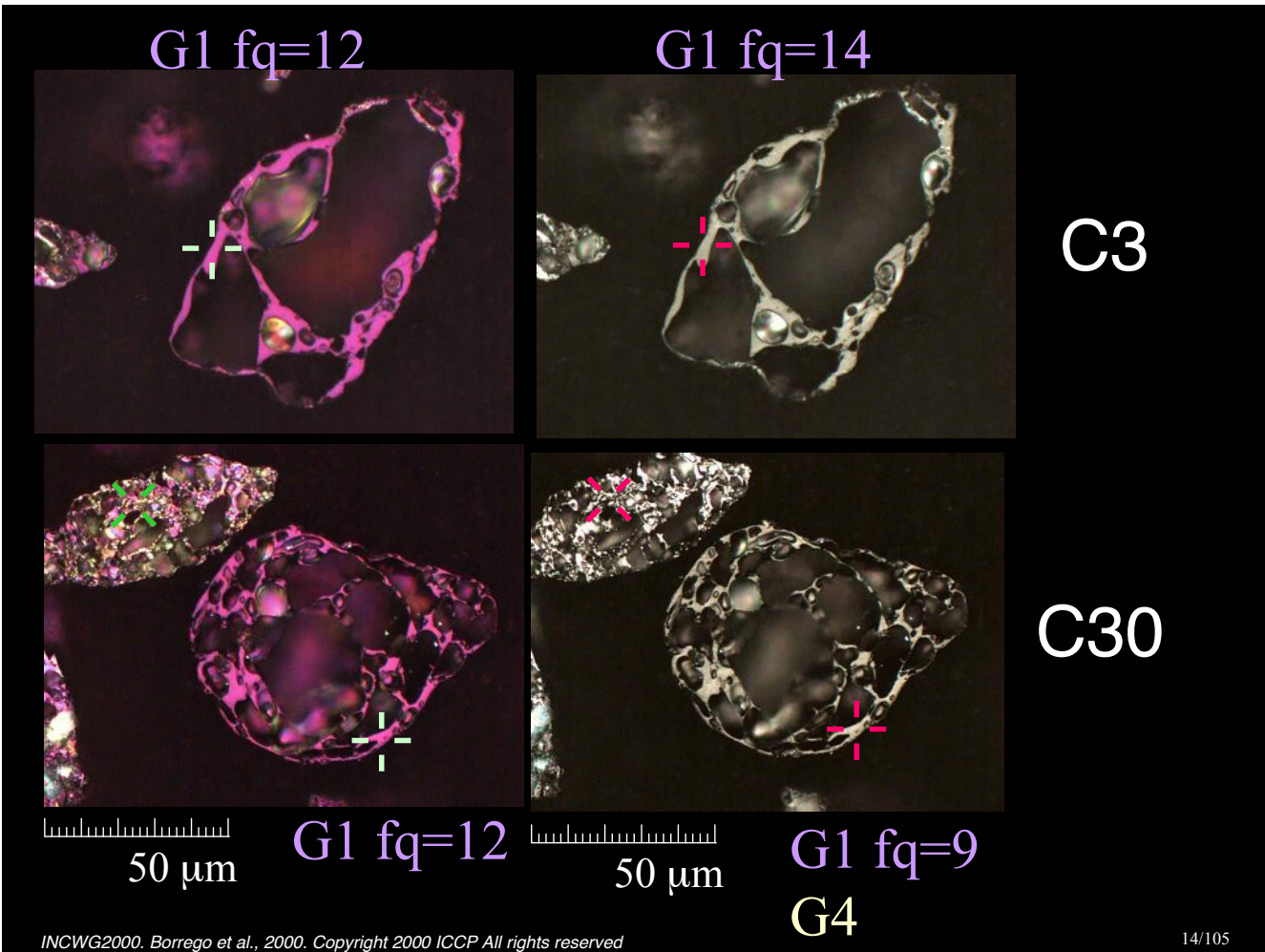
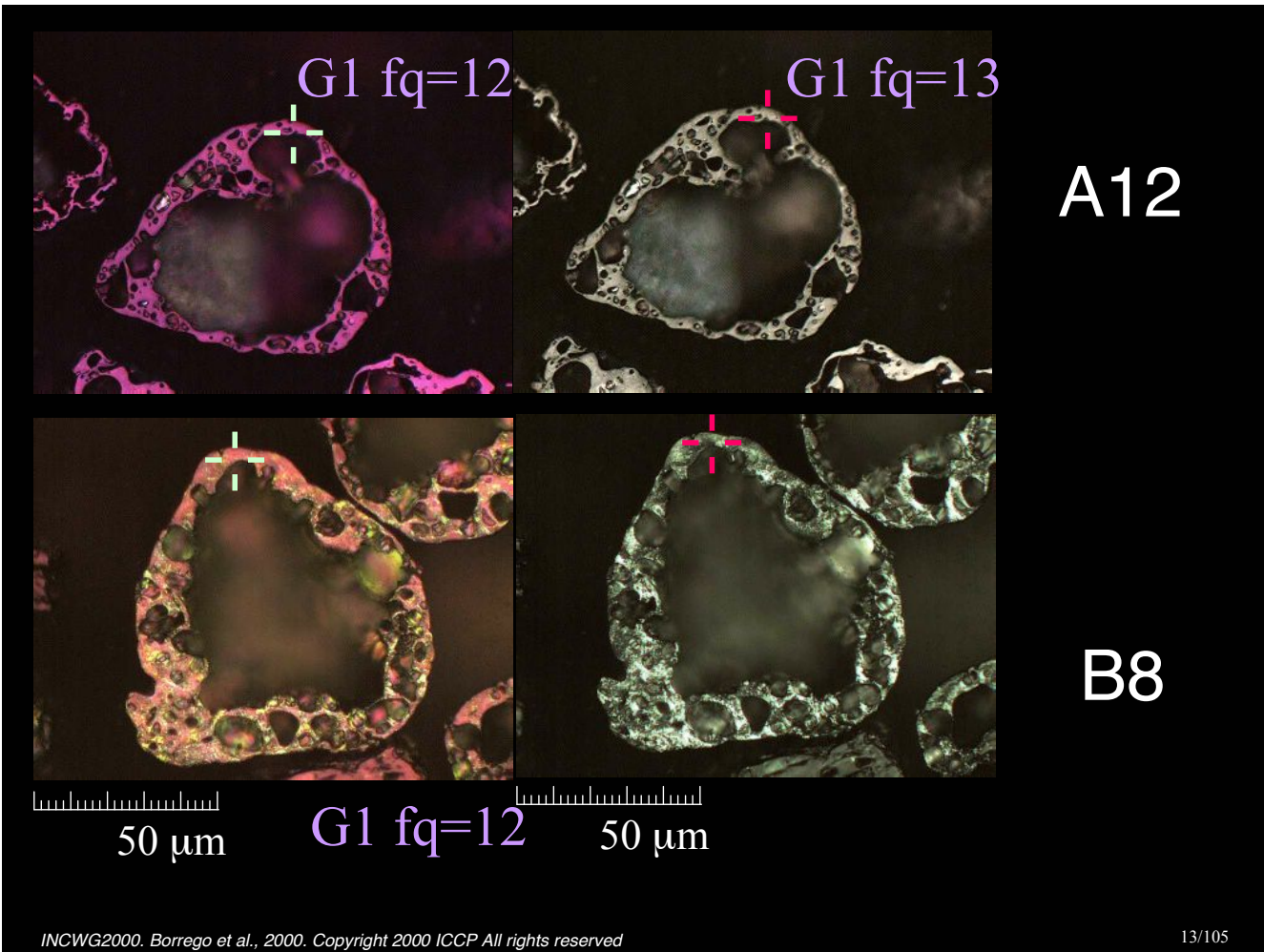
G1 fq=12



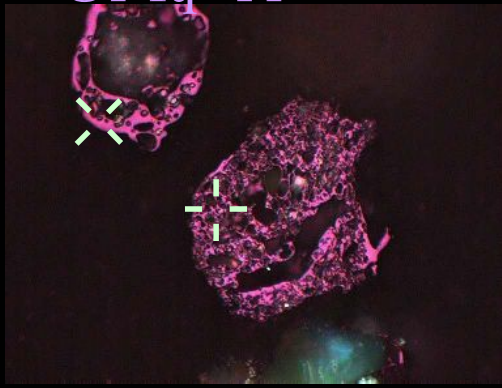
A11

50  $\mu$ m

50  $\mu$ m

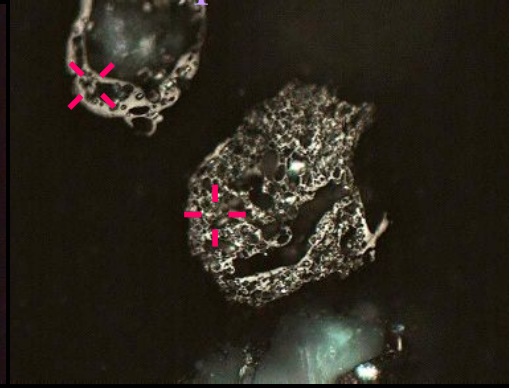


G1 fq=11



50  $\mu\text{m}$

G1 fq=12



50  $\mu\text{m}$

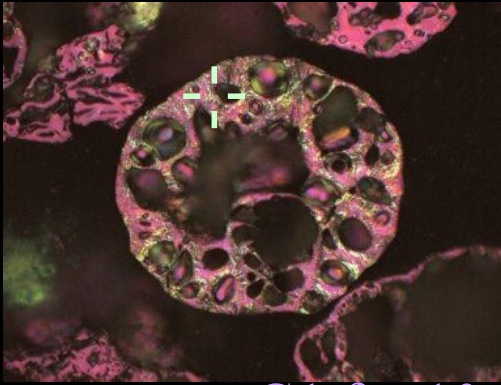
A5

G1 Sure identification  
(Agreement higher than 79 %)

G1 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

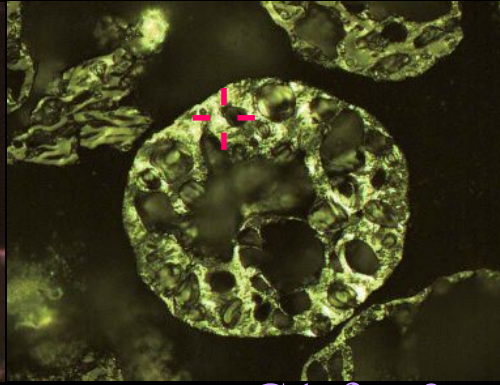
G1 Problems  
(2nd mode over 30%)





50  $\mu\text{m}$

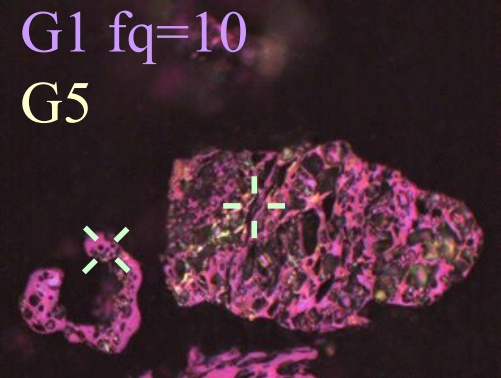
G1 fq=10  
G3



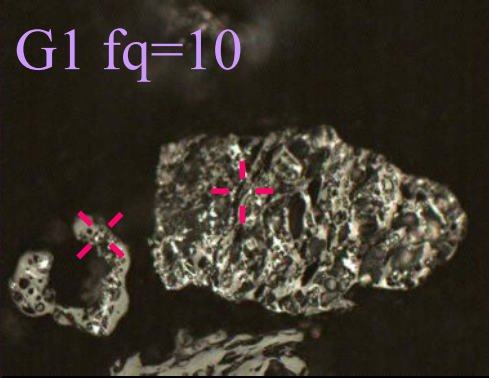
50  $\mu\text{m}$

G1 fq=9  
G3

B1

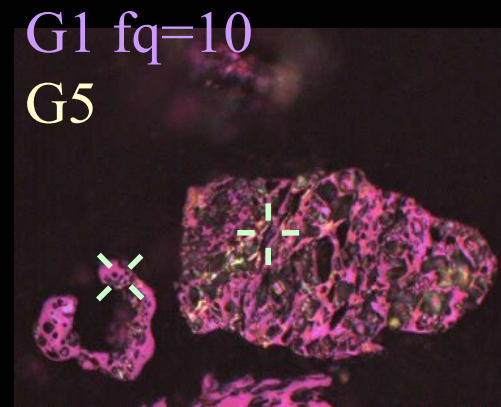


G1 fq=10  
G5

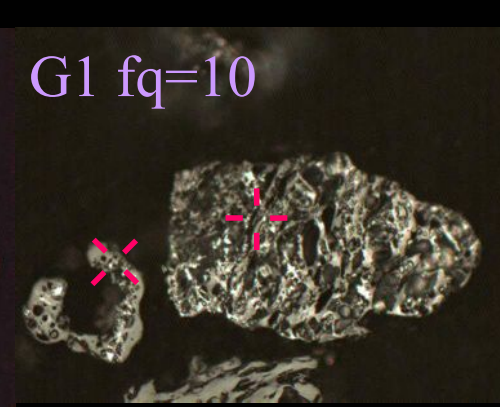


G1 fq=10

C5

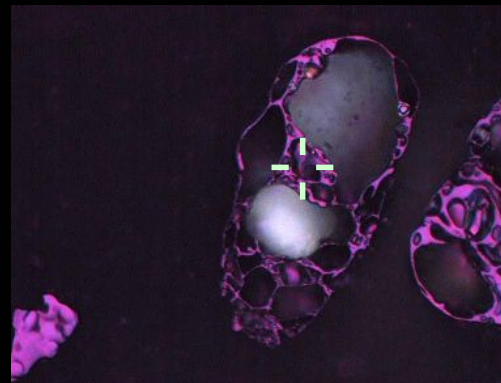


G1 fq=10  
G5



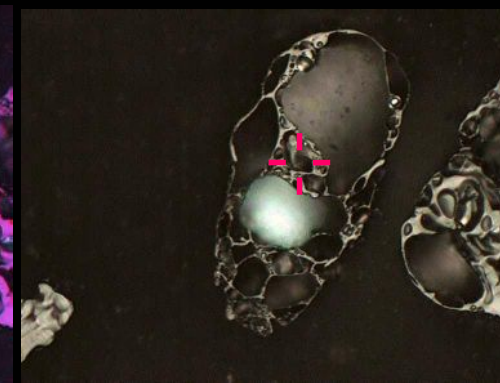
G1 fq=10

C5



50  $\mu\text{m}$

G1 fq=10  
G4



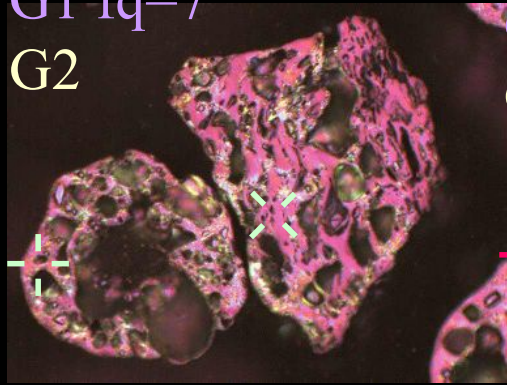
50  $\mu\text{m}$

G1 fq=9  
G4

D1

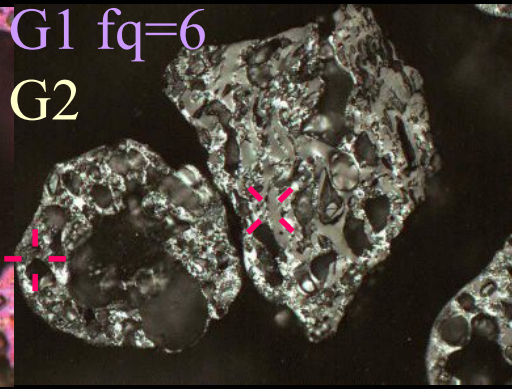
G1 fq=7

G2

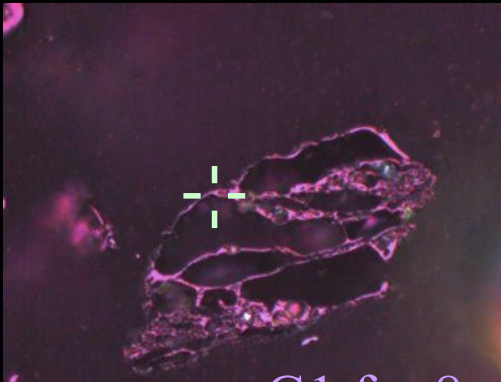


G1 fq=6

G2

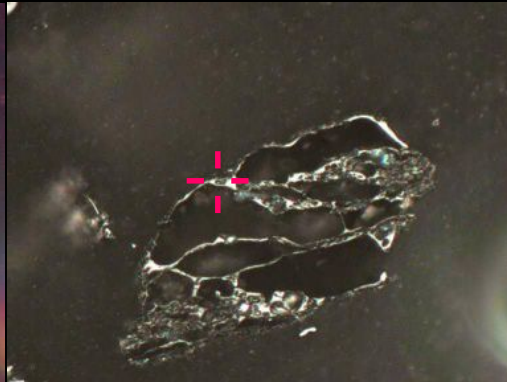


B21



50 μm

G1 fq=8  
G4&G2



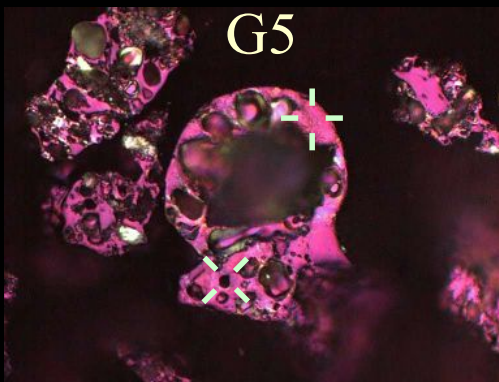
50 μm

G1 fq=8  
G4

A8

G1 fq=7

G5

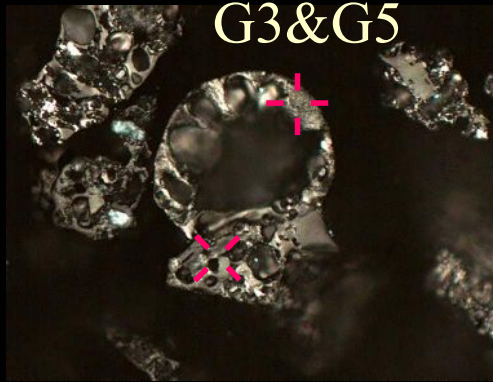


50 μm

G1 fq=10

G1 fq=7

G3&G5

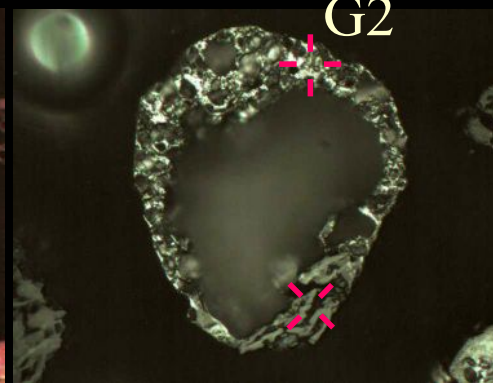
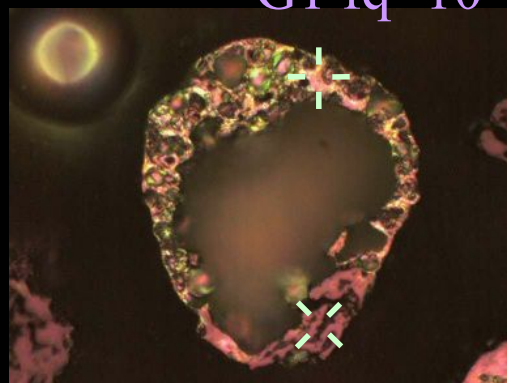


50 μm

G1 fq=9

G2

C38

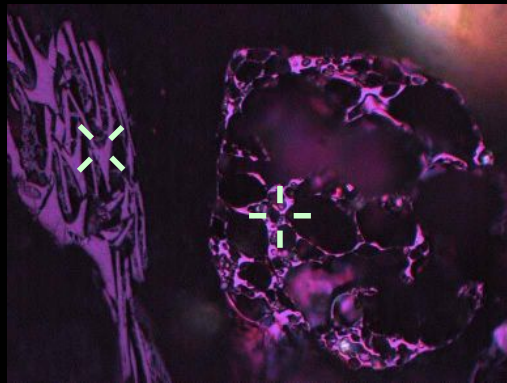


B11

G1 Sure identification  
(Agreement higher than 79 %)

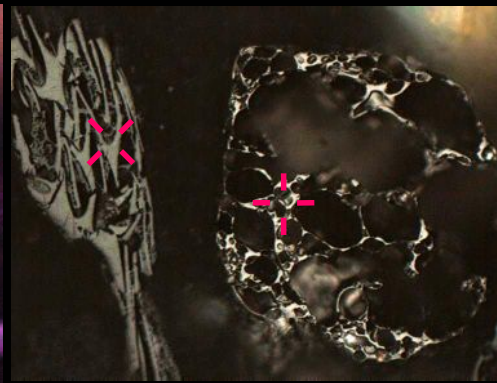
G1 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G1 Problems  
(2nd mode over 30%)



50  $\mu$ m

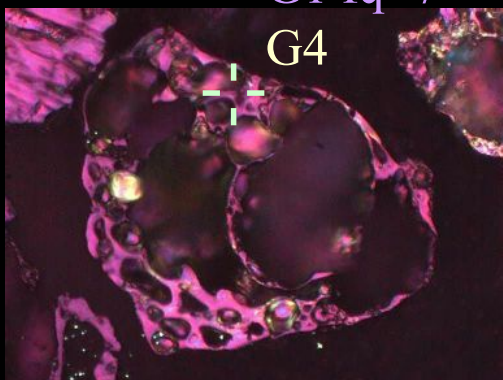
G1 fq=7  
G4  
G1 fq=7



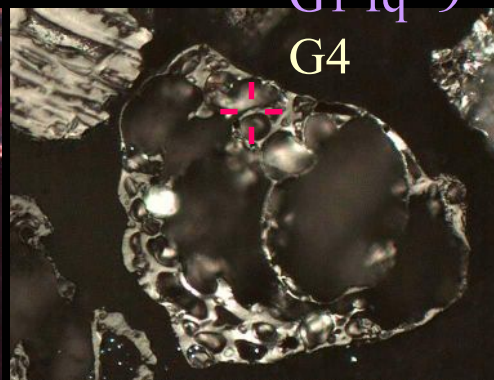
50  $\mu$ m

G4 fq=6  
G1  
G1 fq=9

D2

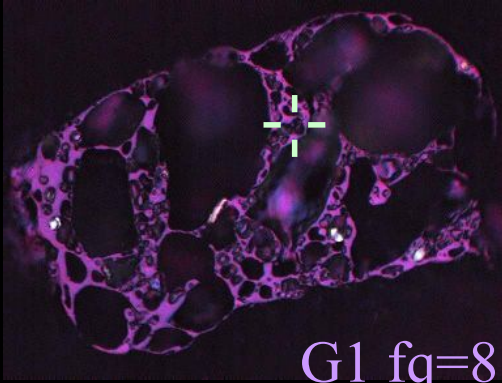


G4



G4

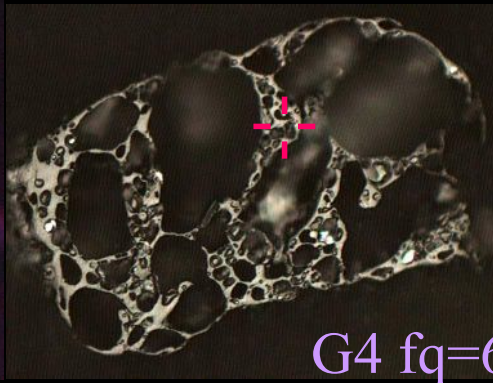
C39



50  $\mu\text{m}$

G1 fq=8

G4

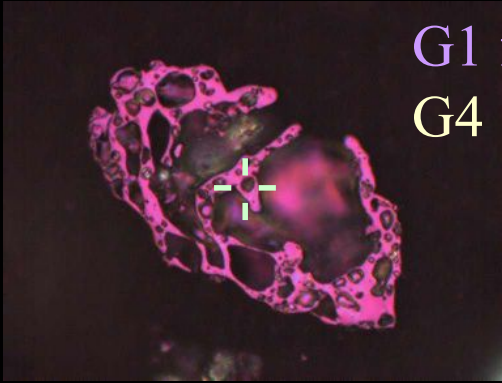


50  $\mu\text{m}$

G4 fq=6

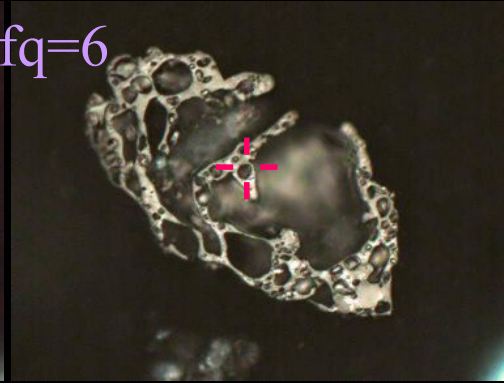
G1

D3

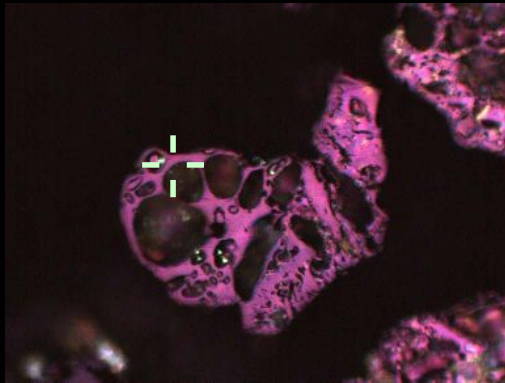


G1 fq=6

G4



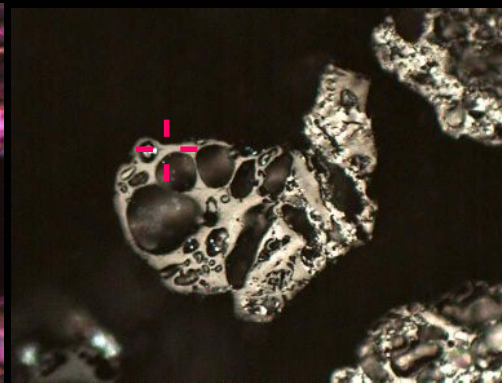
A6



50  $\mu\text{m}$

G1 fq=8

G4



50  $\mu\text{m}$

G4 fq=8

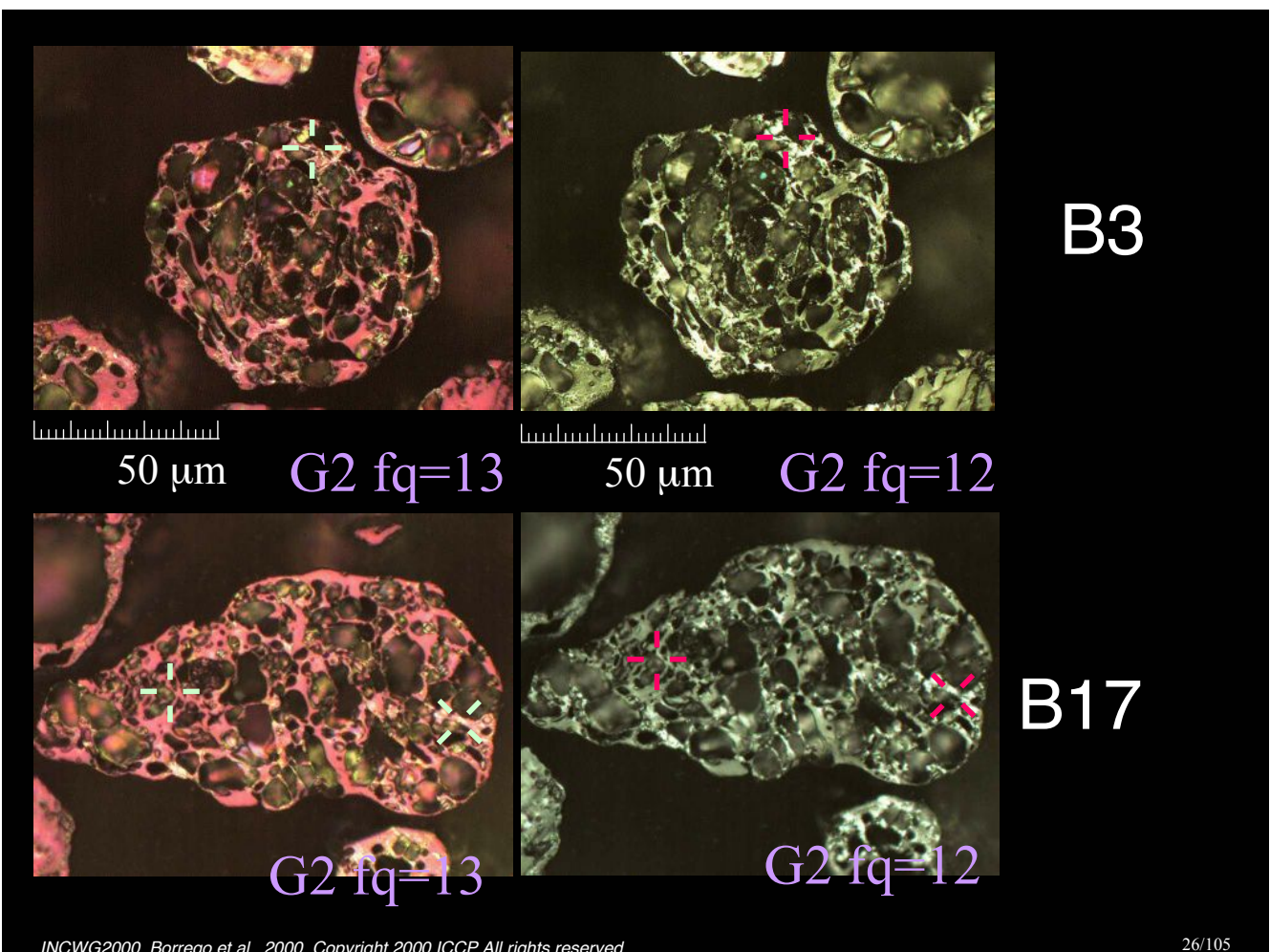
G1

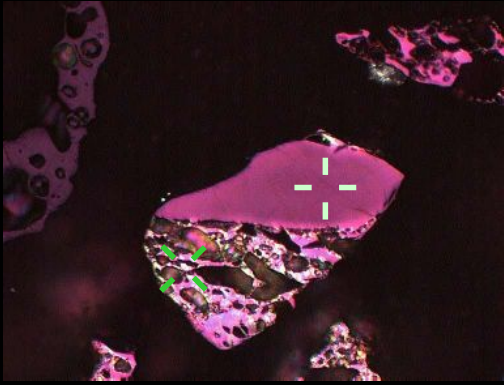
C24

G2 Sure identification  
(Agreement higher than 79 %)

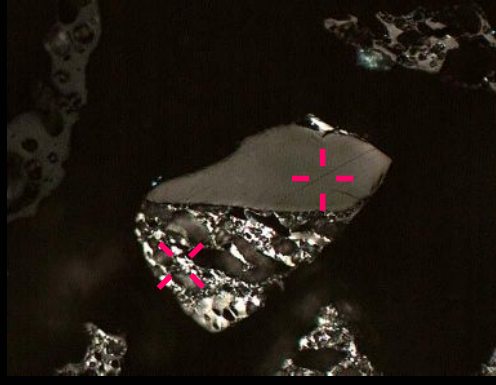
G2 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G2 Problems  
(2nd mode over 30%)



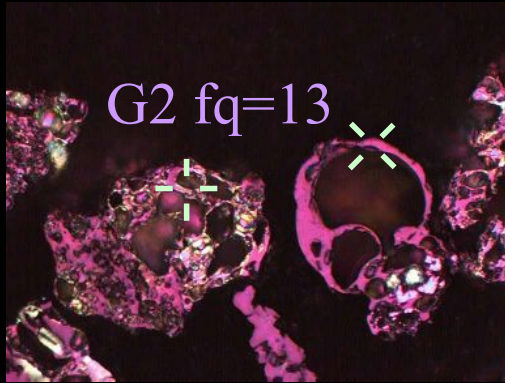


50  $\mu$ m G2 fq=13

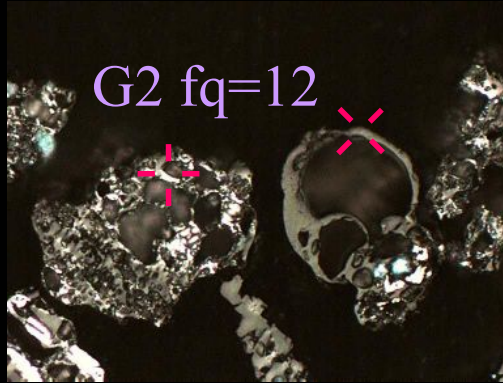


50  $\mu$ m G2 fq=13

C10

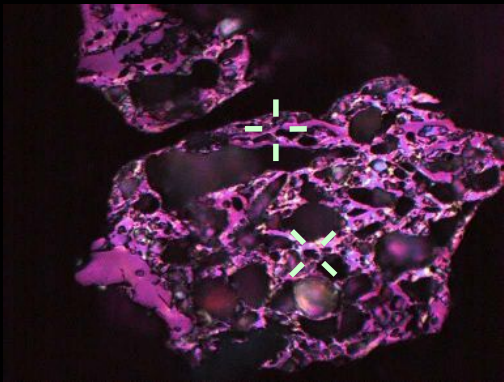


G2 fq=13

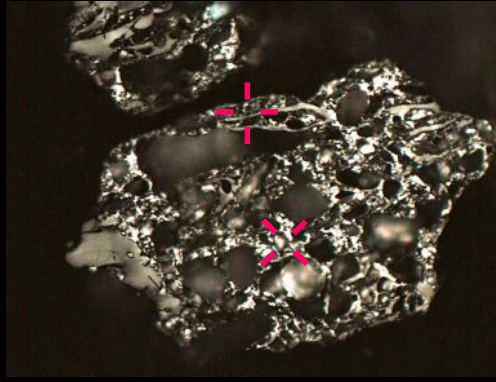


G2 fq=12

C15



50  $\mu$ m G2 fq=13

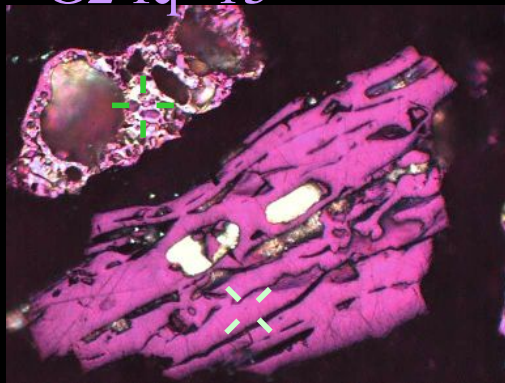


50  $\mu$ m G2 fq=12

C23

G2 fq=13

G2 fq=12



G2 fq=13

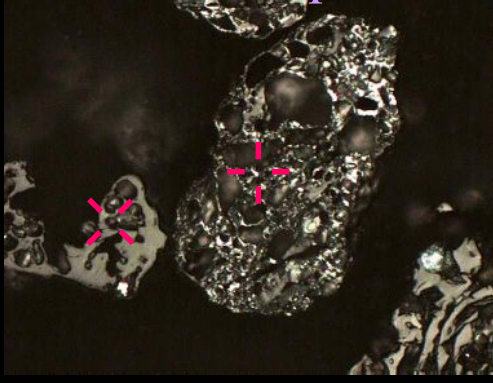
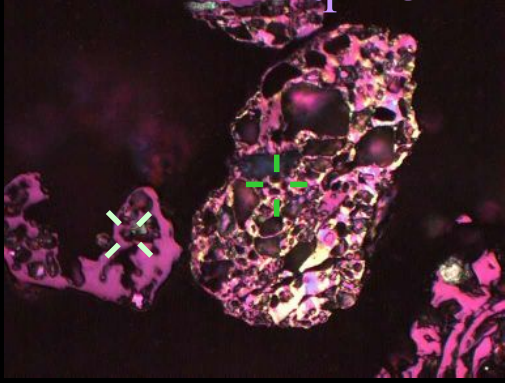


G2 fq=12

C16

G2 fq=13

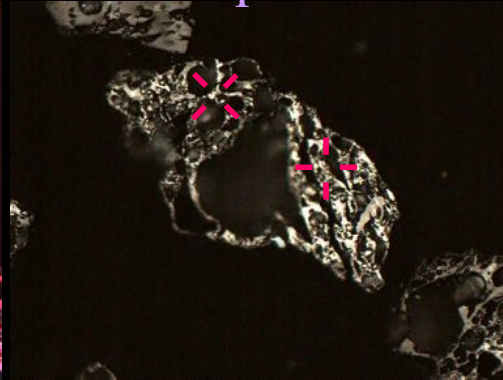
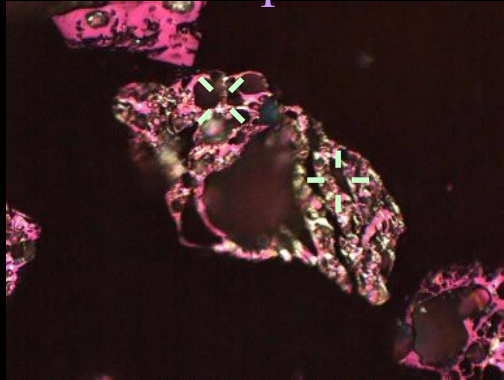
G2 fq=12



C35

G2 fq=13

G2 fq=12



C40



50 μm

G2 fq=11

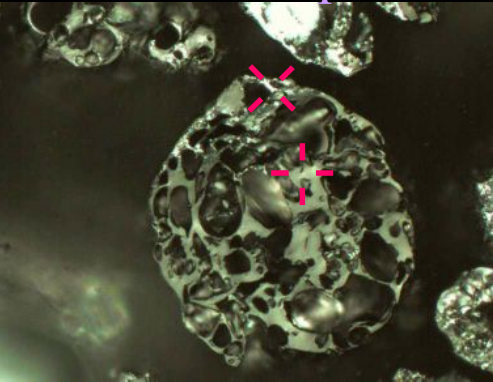
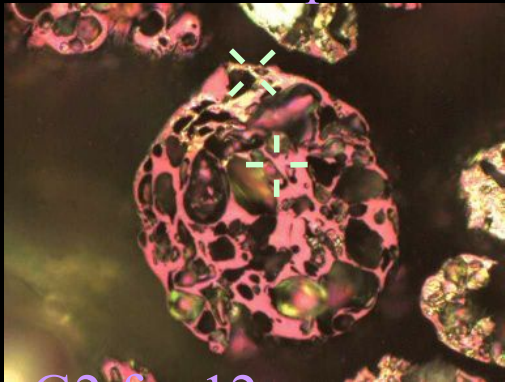


50 μm

G2 fq=11

G2 fq=12

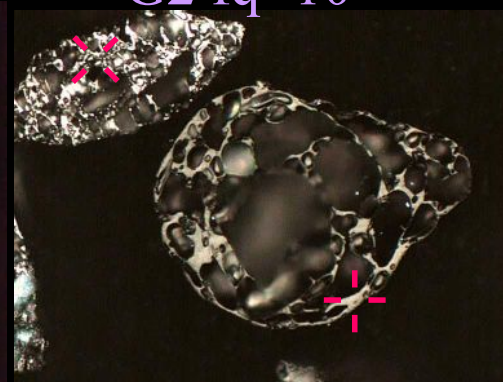
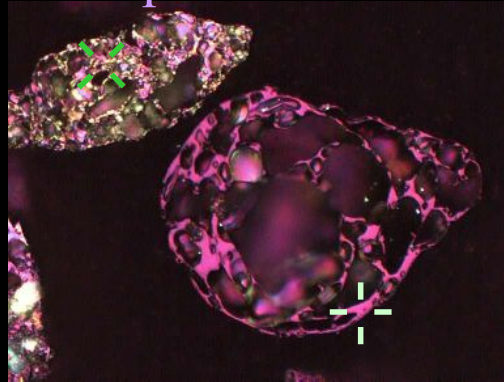
G2 fq=12



B18

G2 fq=12

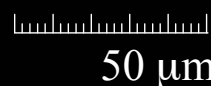
G2 fq=10



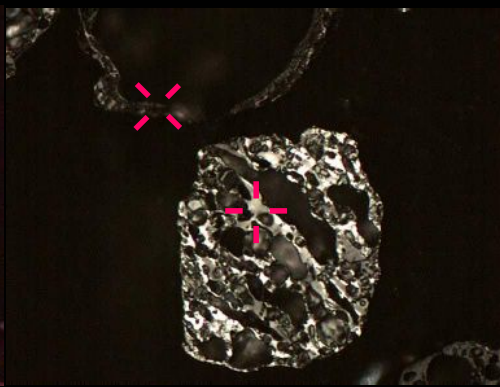
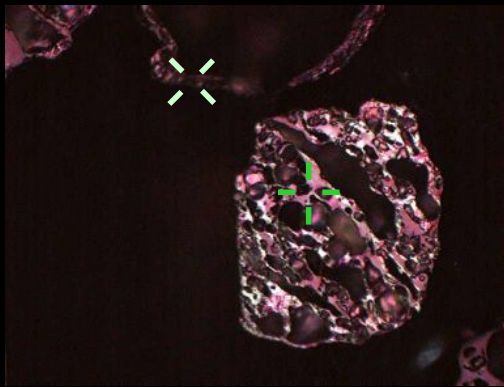
C30



50 μm



50 μm



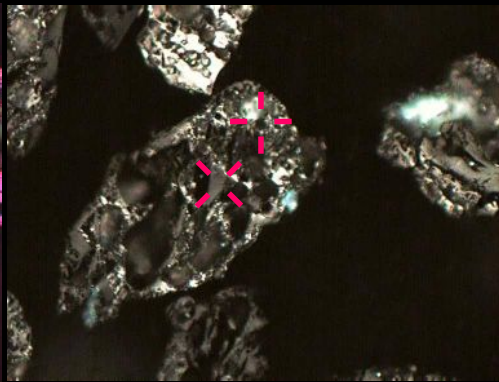
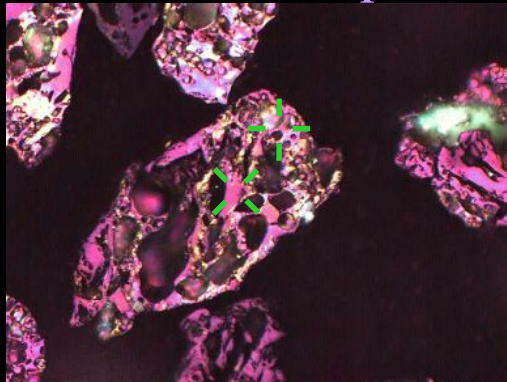
C36

50  $\mu$ m

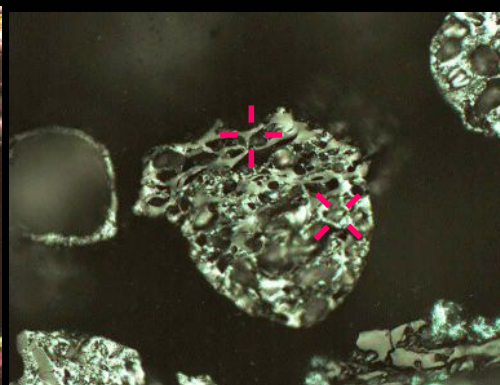
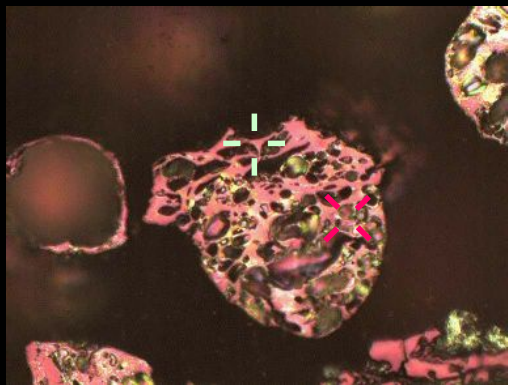
G2 fq=12  
G2 fq=12

50  $\mu$ m

G2 fq=8  
G2 fq=11



C33



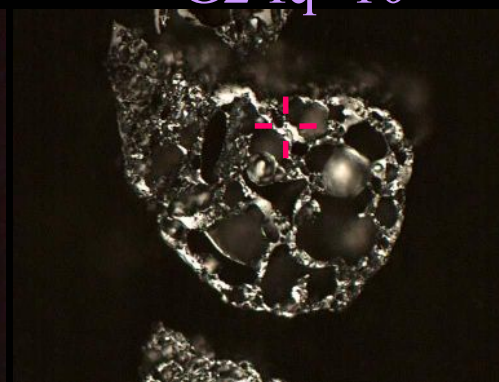
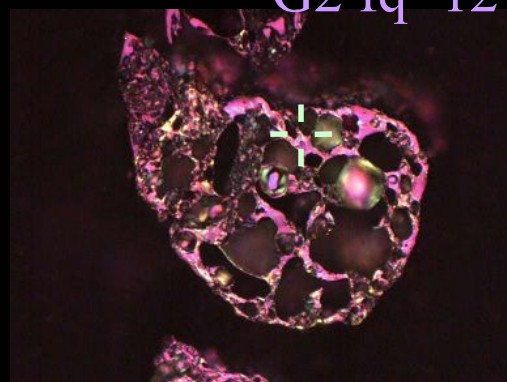
B6

50  $\mu$ m

G2 fq=11  
G2 fq=12

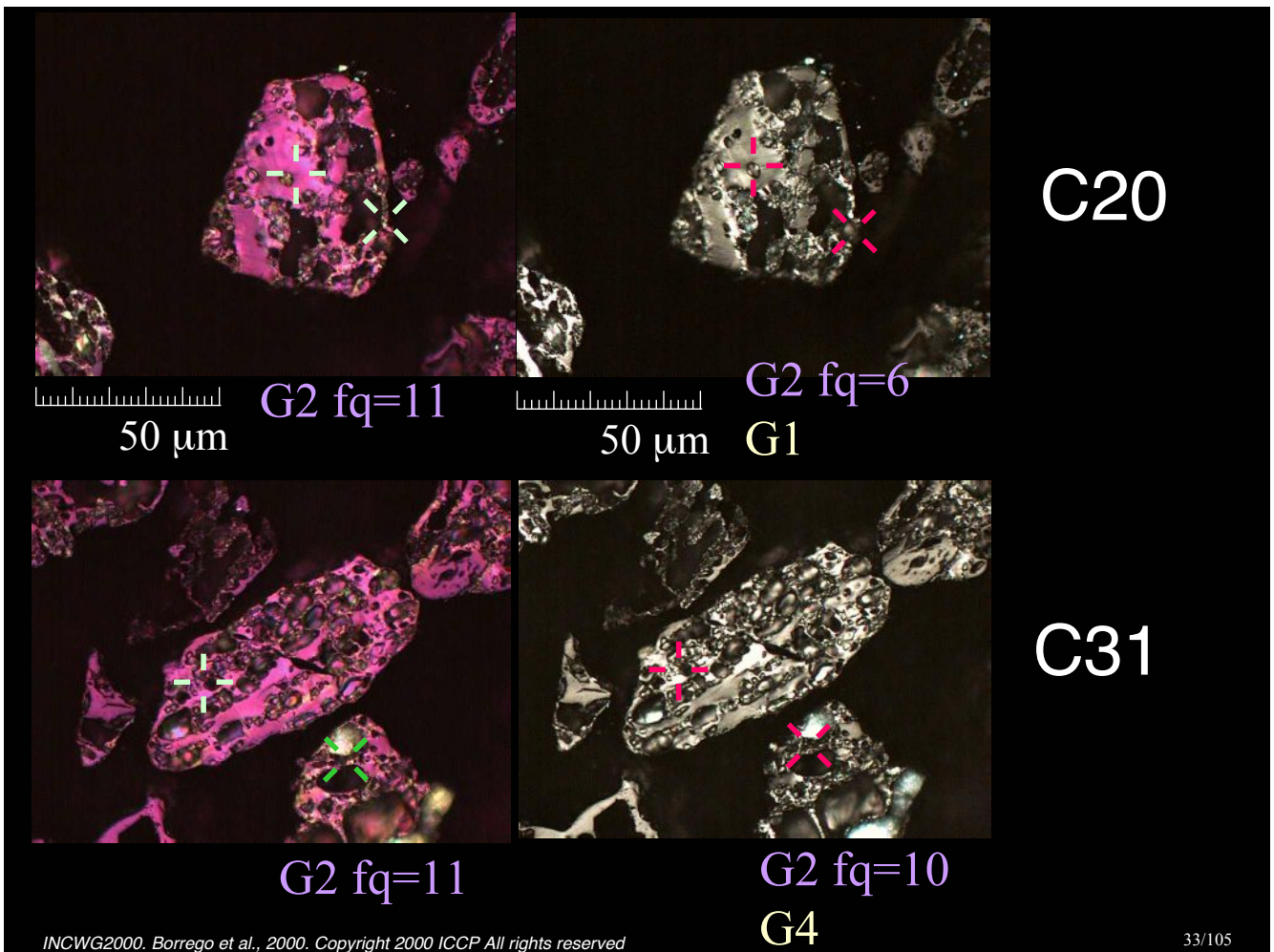
50  $\mu$ m

G2 fq=13  
G2 fq=10



C37





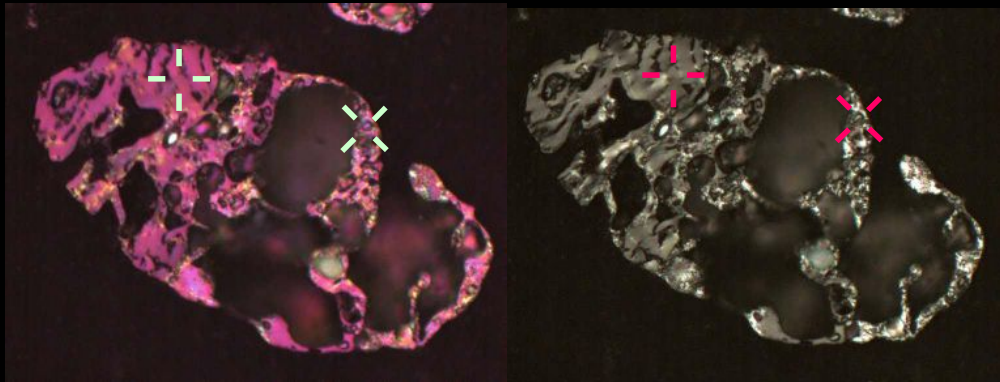
G2 Sure identification  
(Agreement higher than 79 %)

G2 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

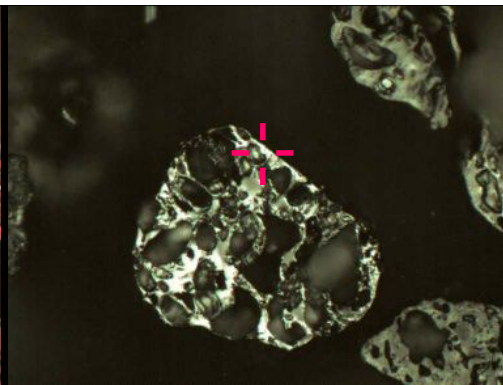
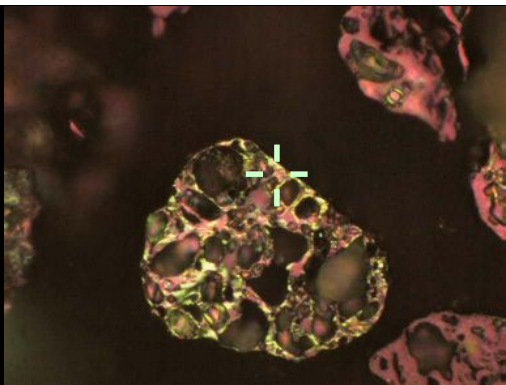
G2 Problems  
(2nd mode over 30%)

G2 fq=10

G2 fq=11



C1



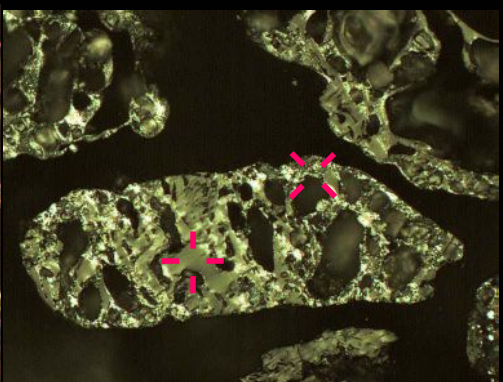
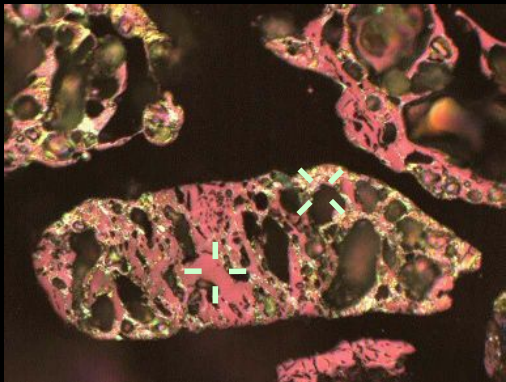
B19

50  $\mu$ m

G2 fq=9  
G1

50  $\mu$ m

G2 fq=11  
G1



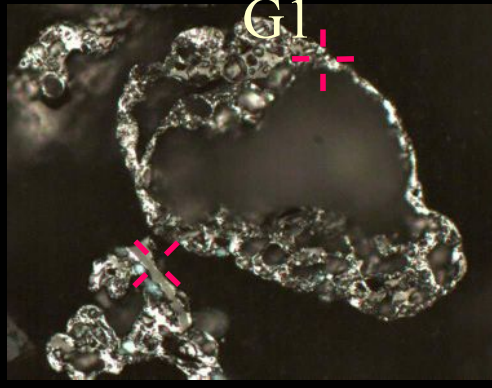
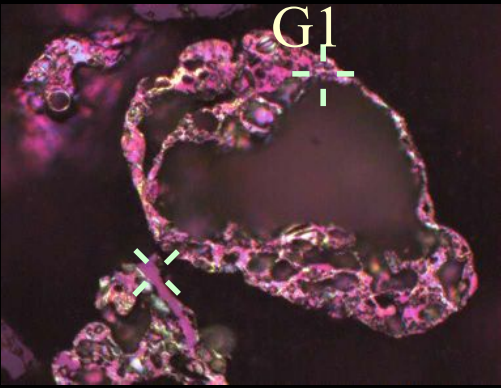
B2

G2 fq=11

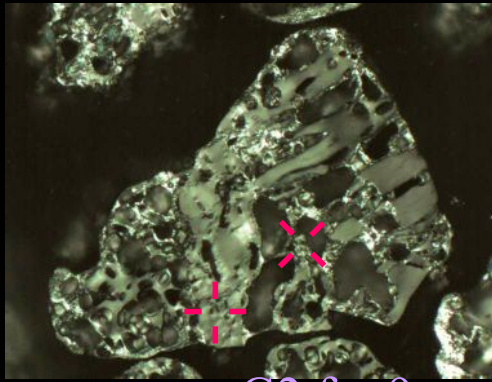
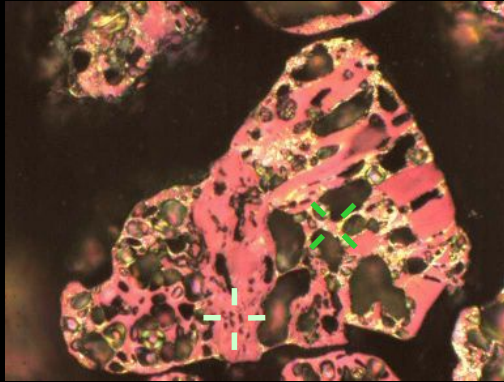
G2 fq=13

G2 fq=10

G2 fq=8



C4



B16



50  $\mu$ m

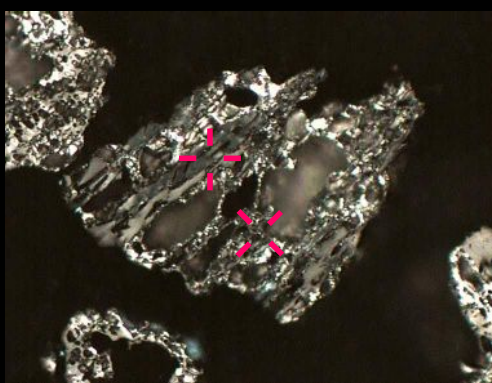
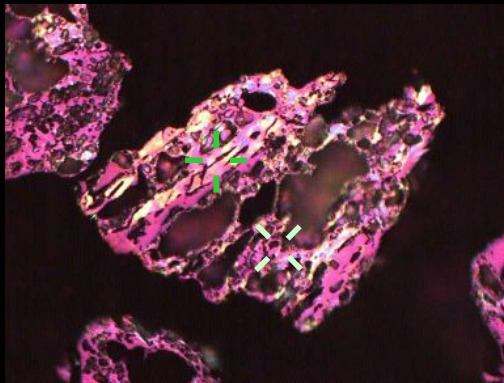
G2 fq=9



50  $\mu$ m

G2 fq=9

G3



C25



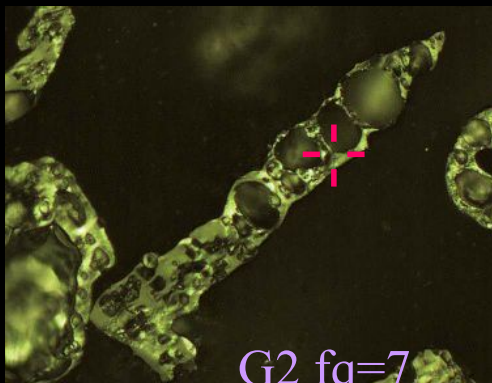
50  $\mu$ m

G2 fq=9



50  $\mu$ m

G2 fq=9

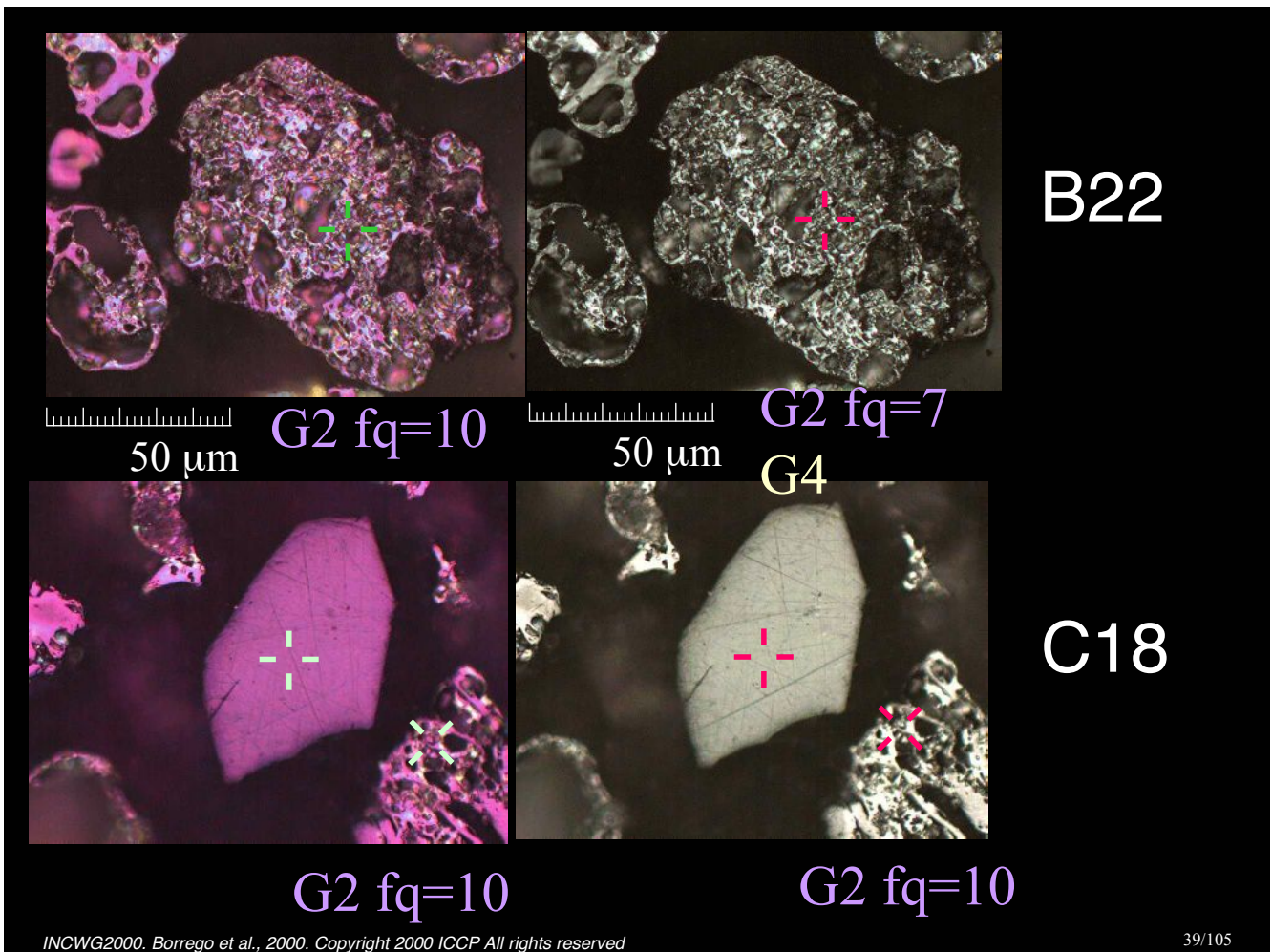


B20

G2 fq=10

G2 fq=7

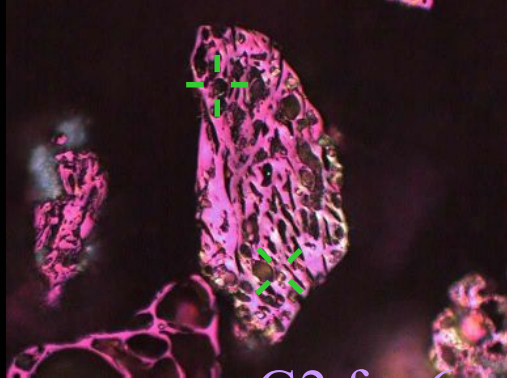
G1



G2 Sure identification  
(Agreement higher than 79 %)

G2 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G2 Problems  
(2nd mode over 30%)



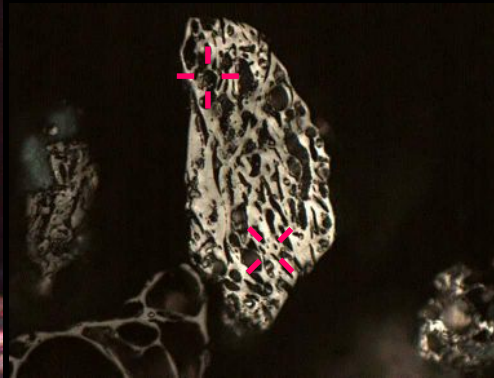
50  $\mu$ m

G2 fq=6

G3

G2 fq=6

G4



50  $\mu$ m

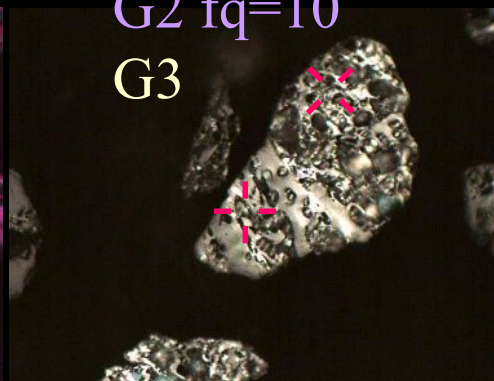
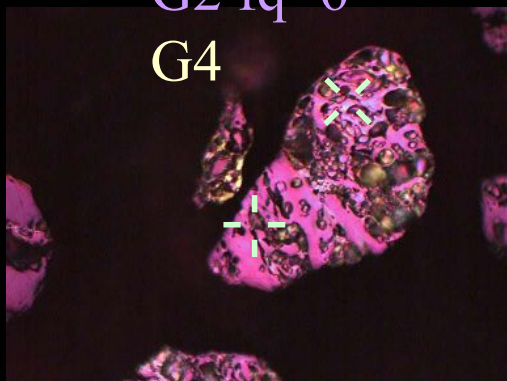
G5 fq=10

G2

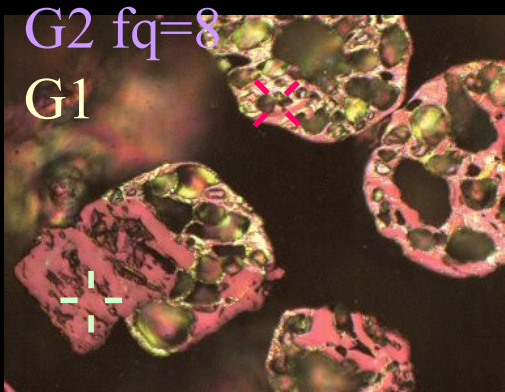
G2 fq=10

G3

C28



C34

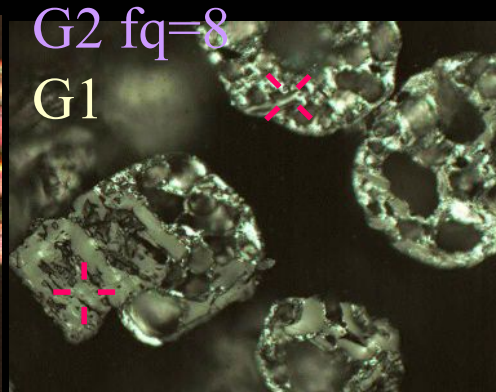


50  $\mu$ m

G2 fq=8

G1

G2 fq=7



50  $\mu$ m

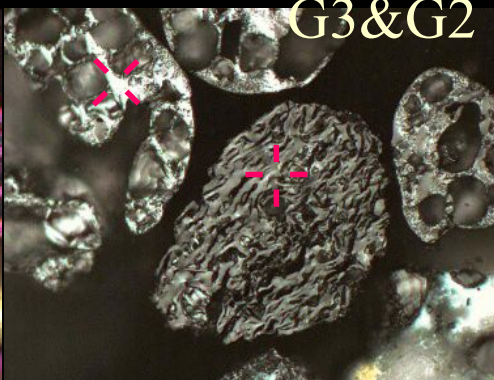
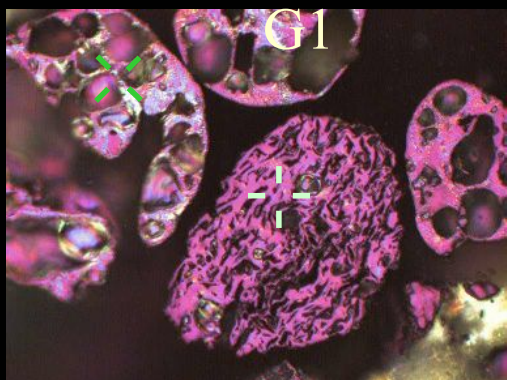
G2 fq=8

G1

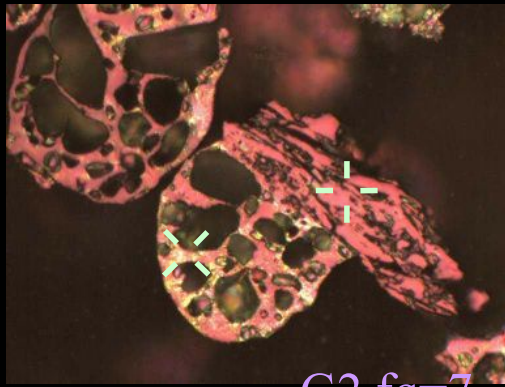
G1 fq=5

G3&G2

B10



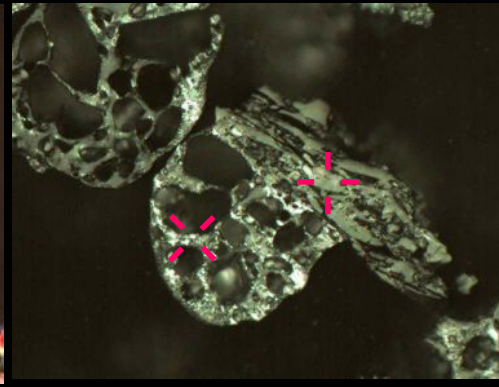
B24



50 µm

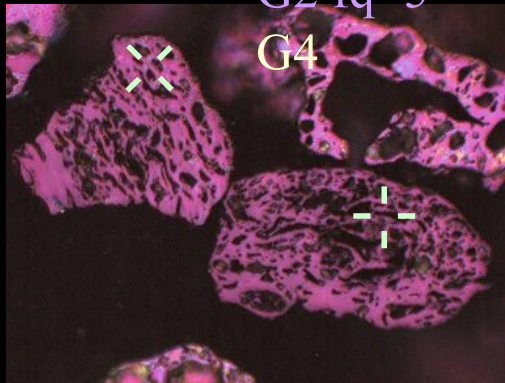
G2 fq=7

G1



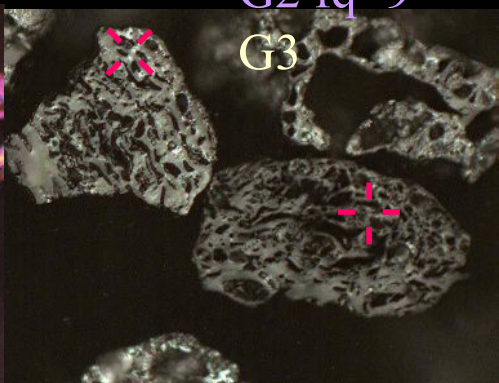
50 µm

B15



G2 fq=5

G4



G2 fq=9

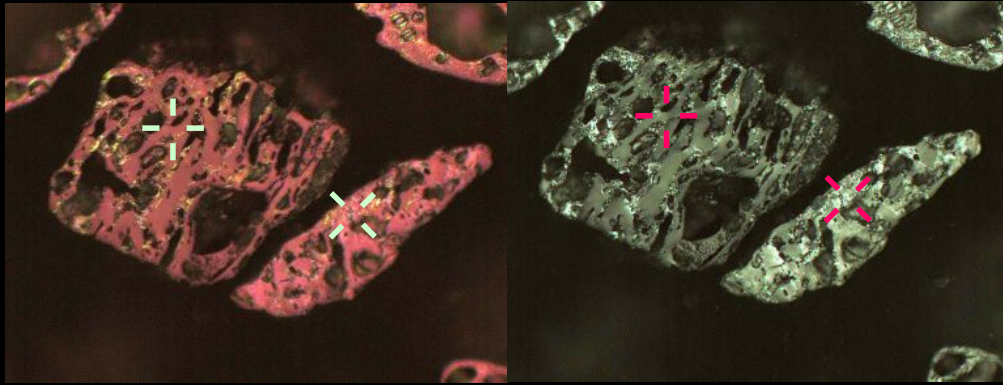
G3

B25

G3 Sure identification  
(Agreement higher than 79 %)

G3 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G3 Problems  
(2nd mode over 30%)



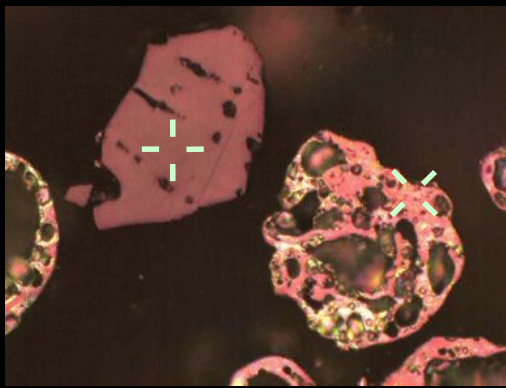
50  $\mu\text{m}$

G3 fq=12

50  $\mu\text{m}$

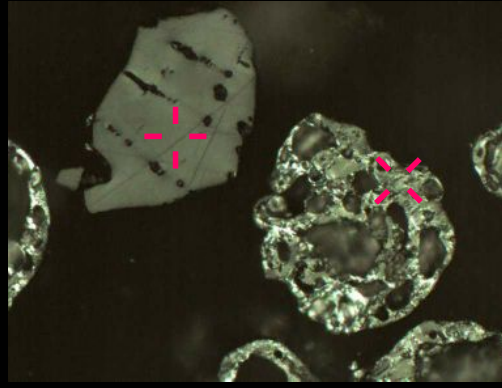
G3 fq=10

B9



50  $\mu\text{m}$

G3 fq=11



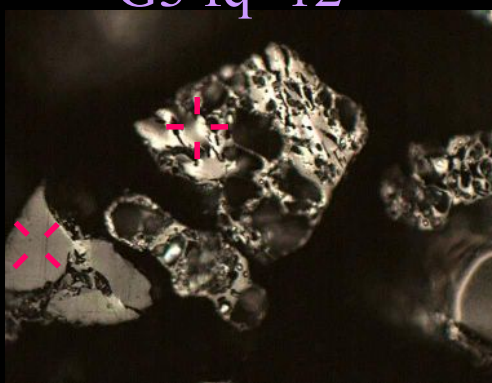
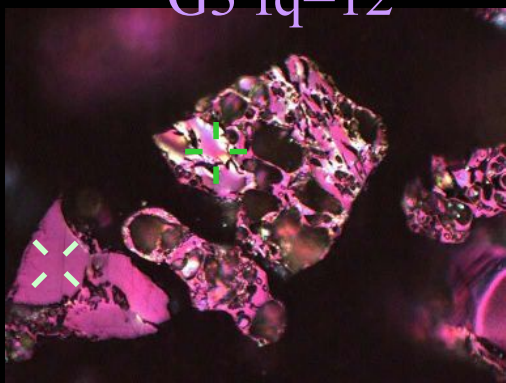
50  $\mu\text{m}$

G3 fq=11

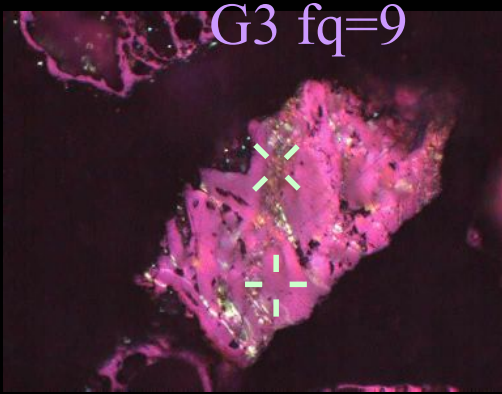
G3 fq=12

G3 fq=12

B13

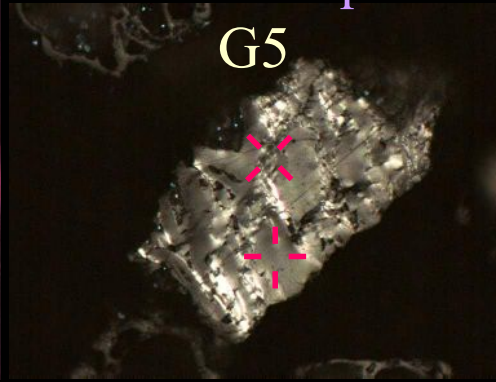


C27



G3 fq=9

50  $\mu\text{m}$

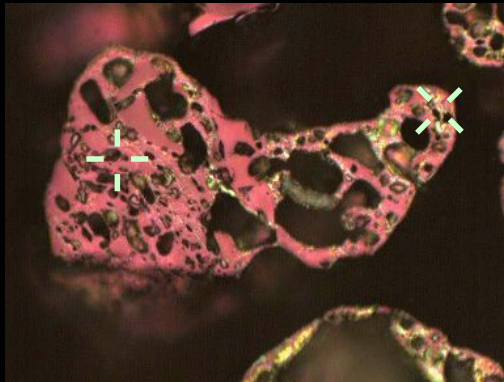


G3 fq=8

G5

50  $\mu\text{m}$

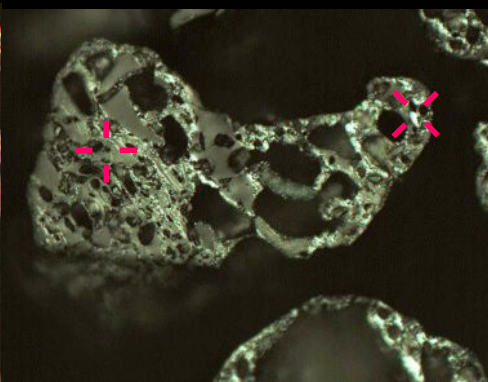
C14



G3 fq=6

50  $\mu\text{m}$

G2

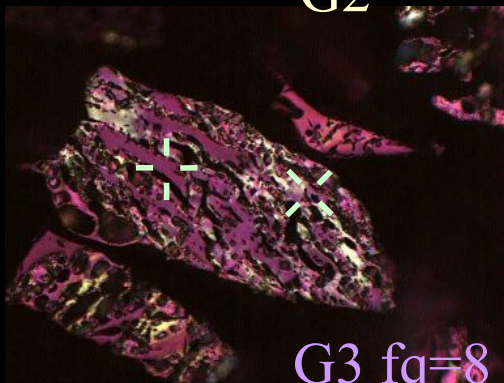


G2 fq=7

50  $\mu\text{m}$

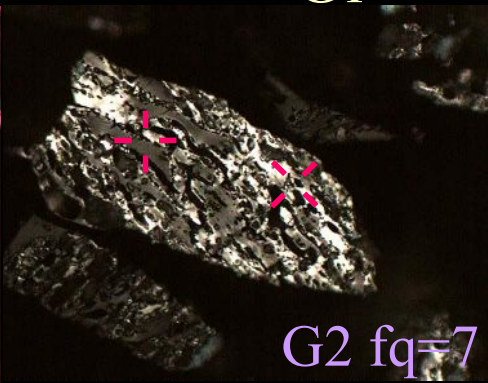
G1

B4



G3 fq=8

G2

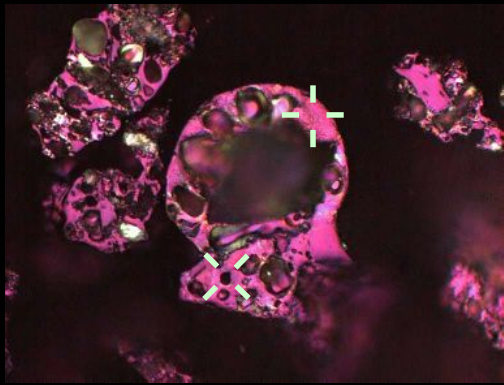


G2 fq=7

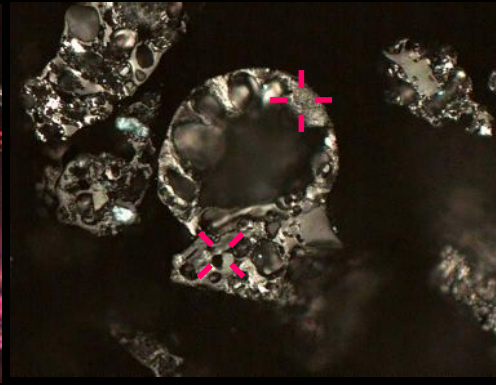
G3

C13



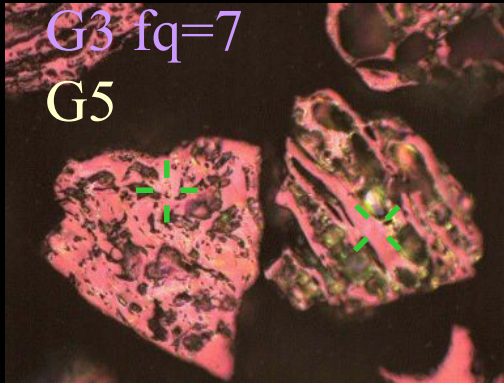


50  $\mu\text{m}$  G3 fq=3

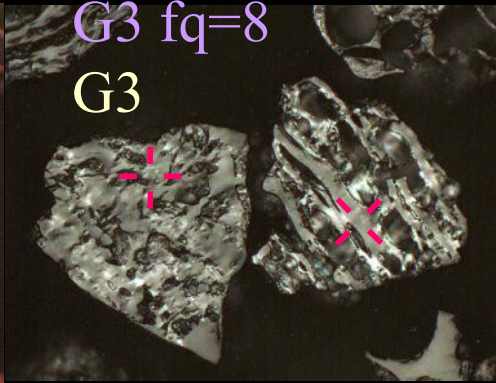


50  $\mu\text{m}$  G2 fq=6

C38



G3 fq=7  
G5



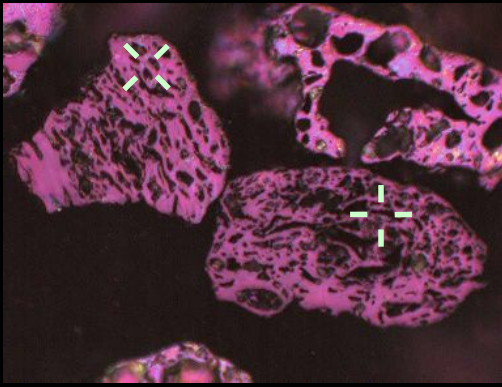
G3 fq=8  
G3

B26

G4 Sure identification  
(Agreement higher than 79 %)

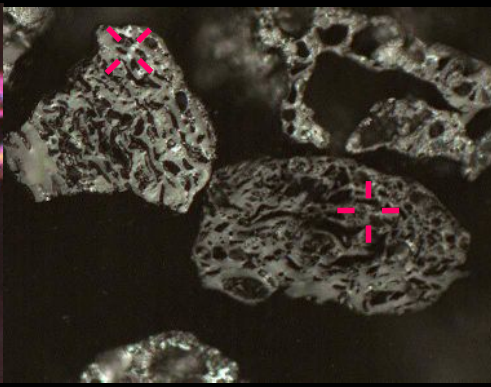
G4 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G4 Problems  
(2nd mode over 30%)



50  $\mu$ m

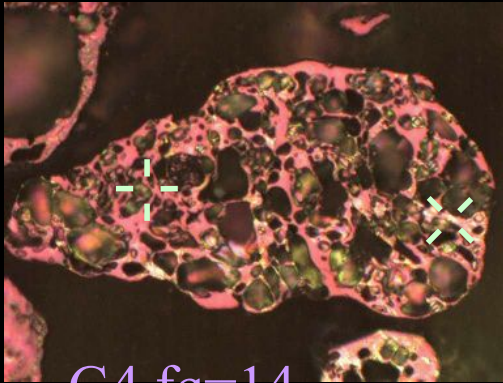
G4 fq=14



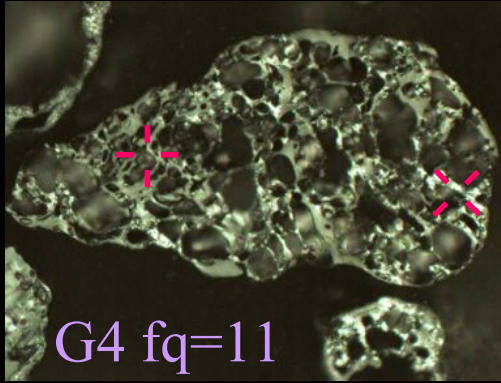
50  $\mu$ m

G4 fq=11

B25



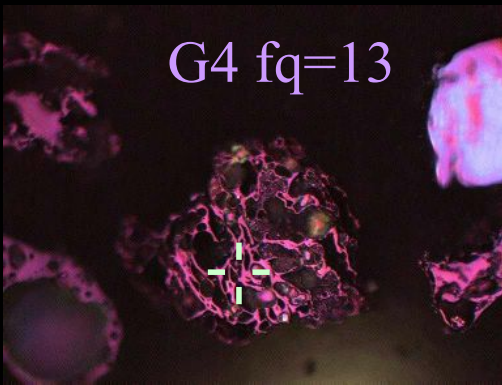
G4 fq=14



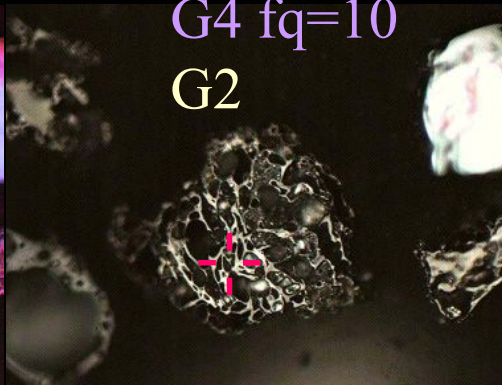
G4 fq=11

G2

B17



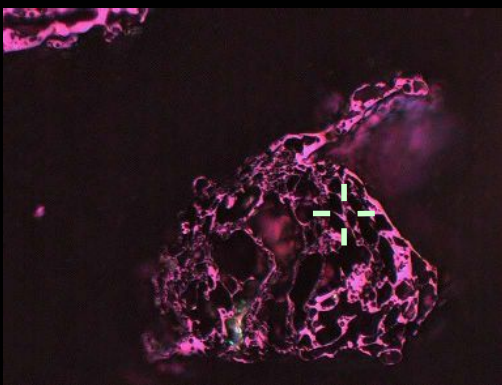
G4 fq=13



G4 fq=10

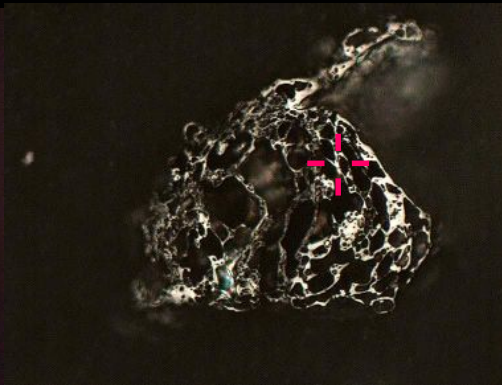
G2

A2



50  $\mu$ m

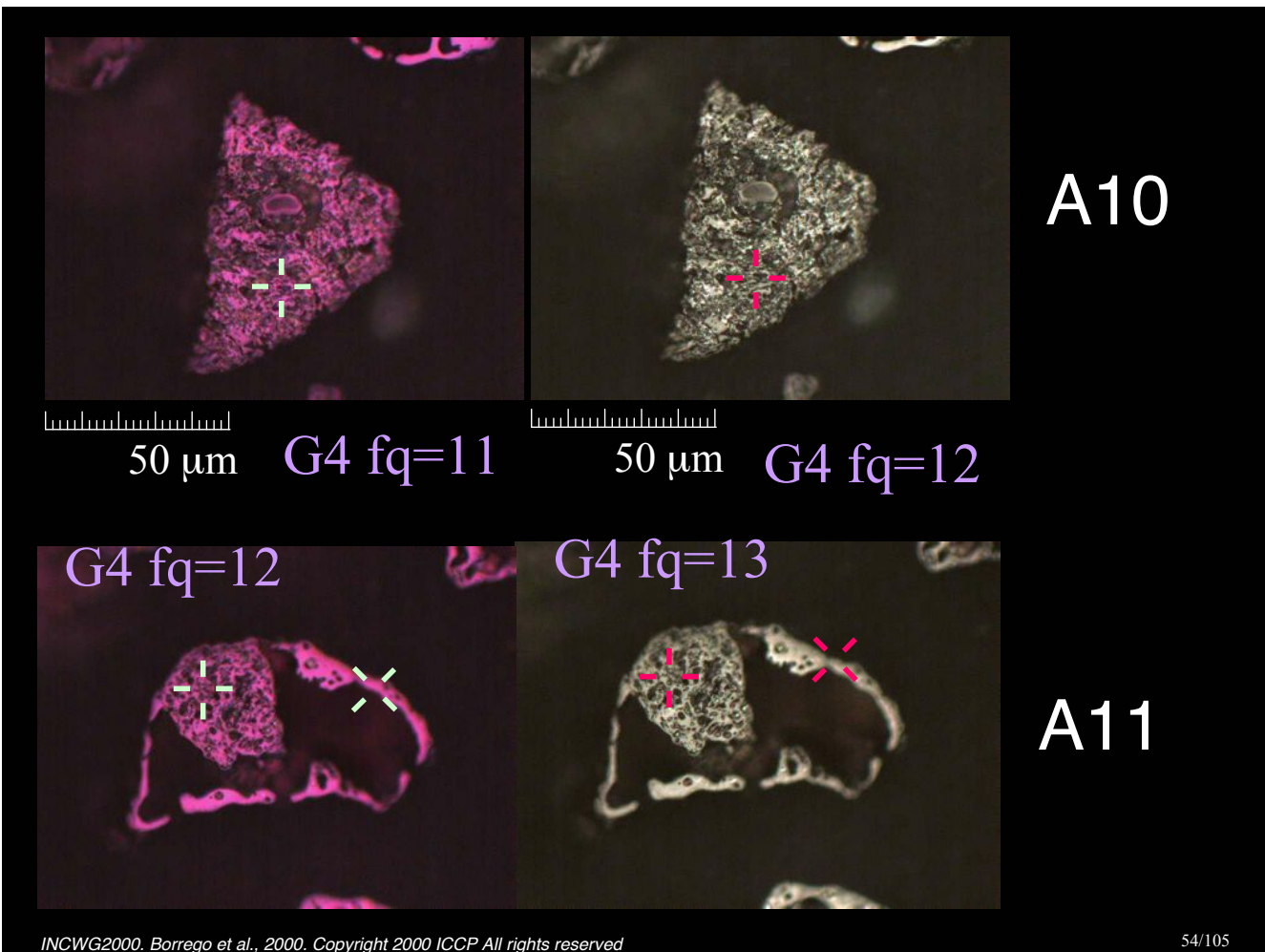
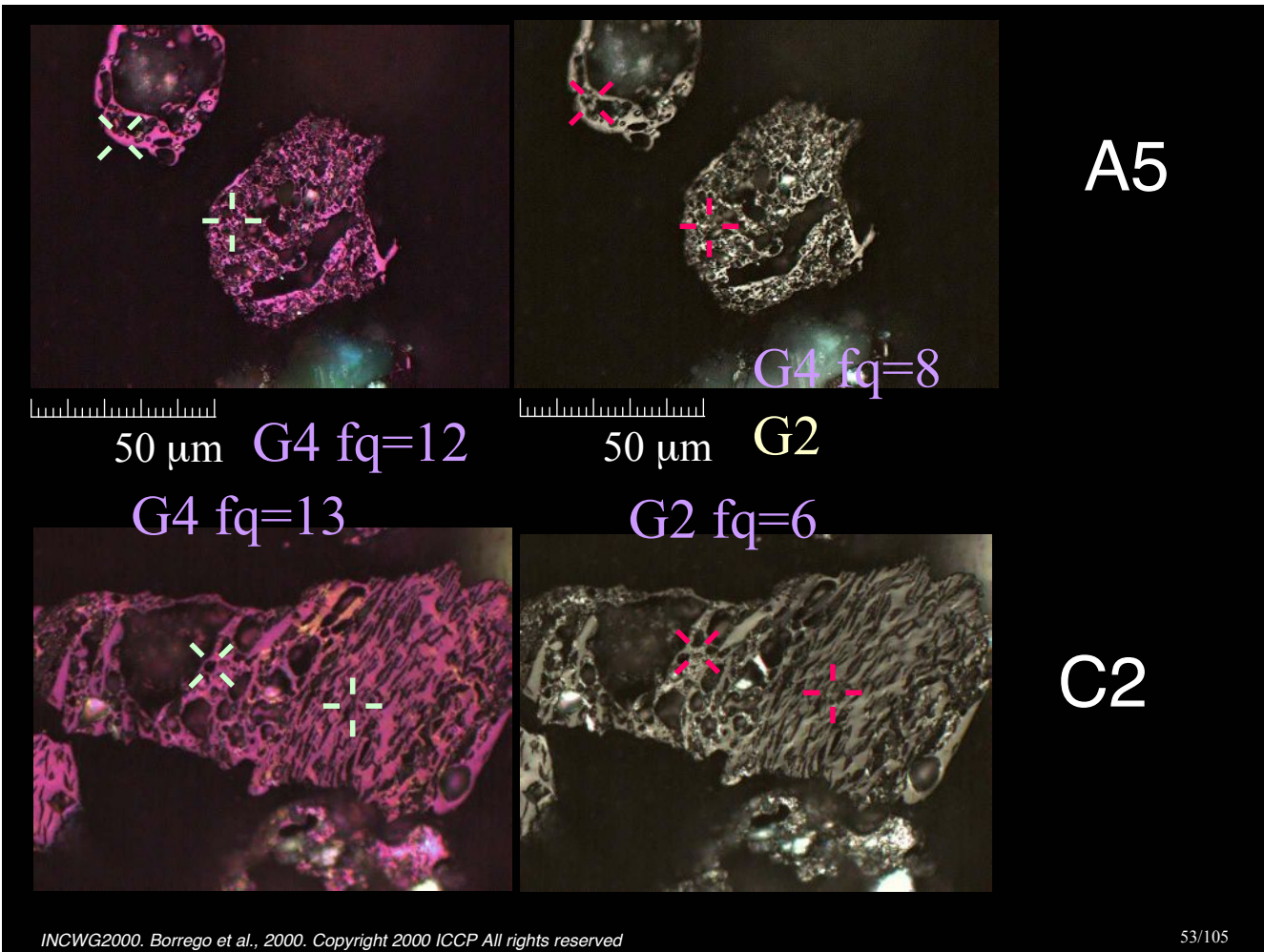
G4 fq=13

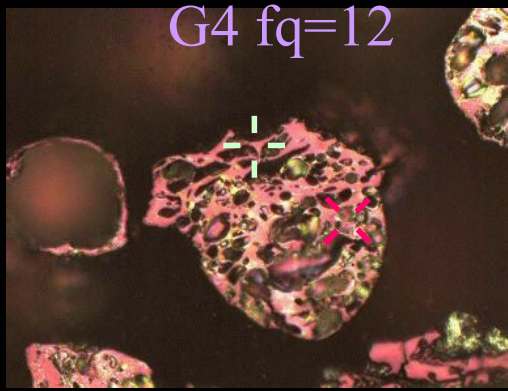


50  $\mu$ m

G4 fq=10

A3

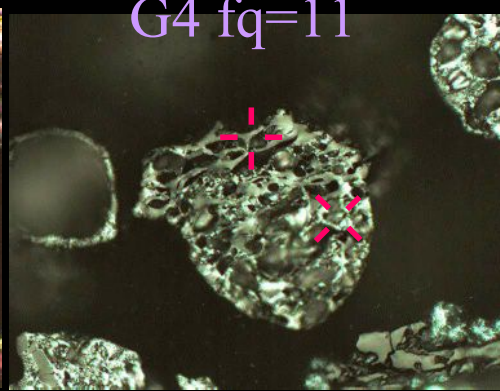




G4 fq=12



50  $\mu$ m

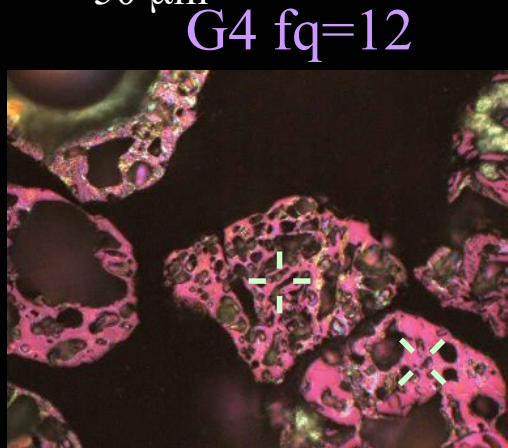


G4 fq=11

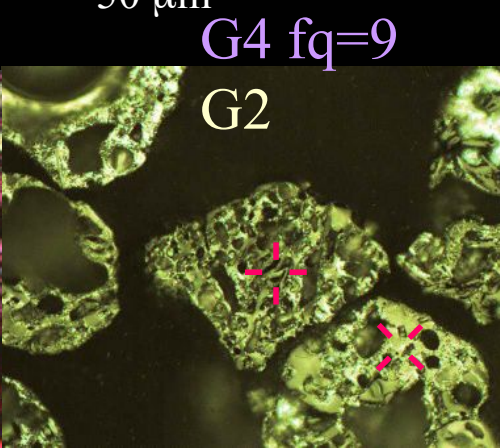


50  $\mu$ m

B6



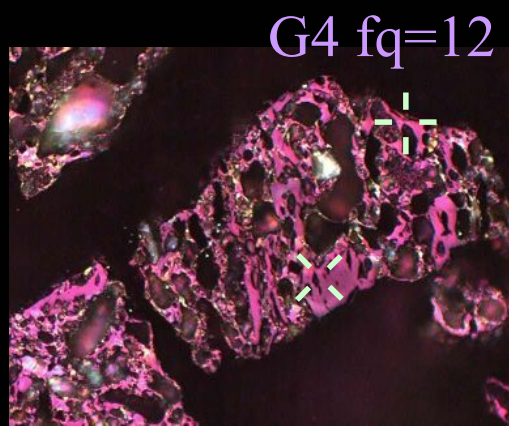
G4 fq=12



G4 fq=9

G2

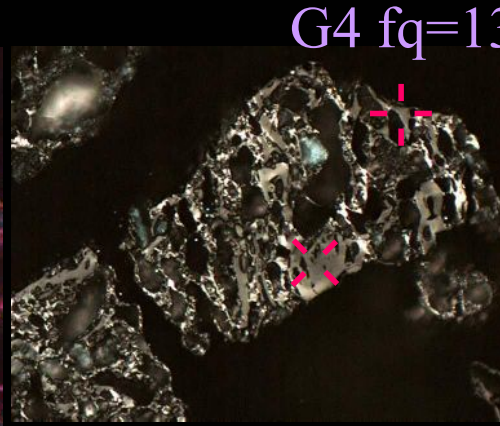
B12



G4 fq=12



50  $\mu$ m

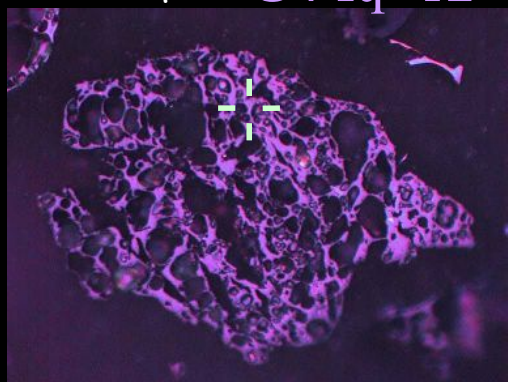


G4 fq=13

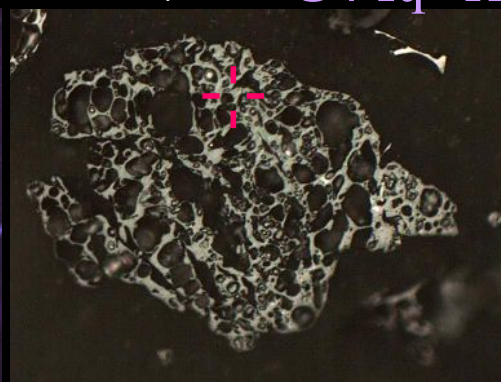


50  $\mu$ m

C29

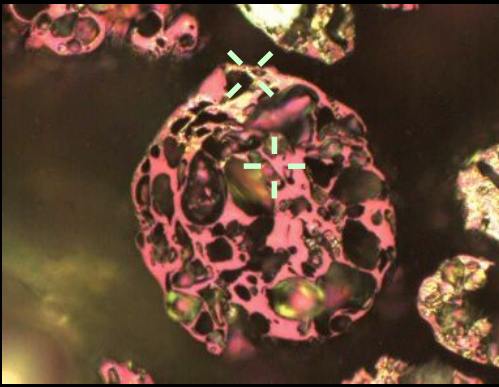


G4 fq=12



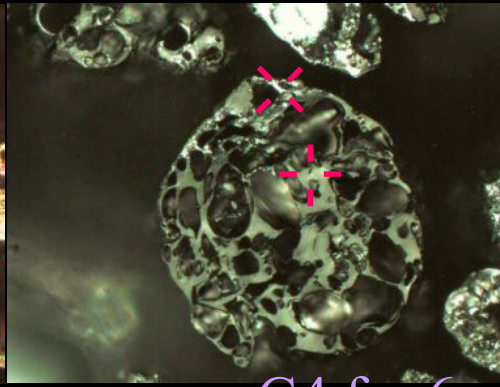
G4 fq=12

D7



50  $\mu\text{m}$

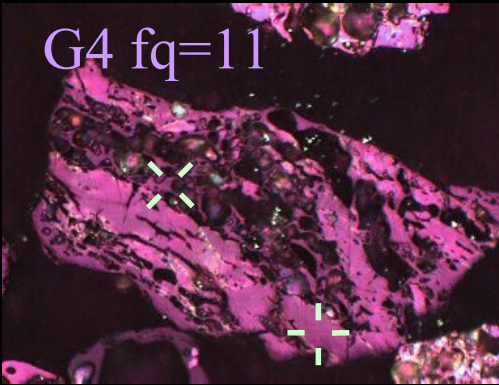
G4 fq=11



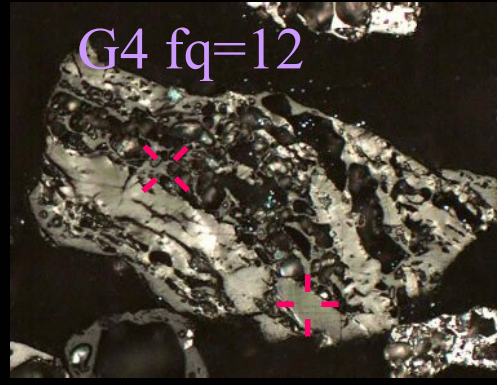
50  $\mu\text{m}$

G4 fq=6  
G5

B18

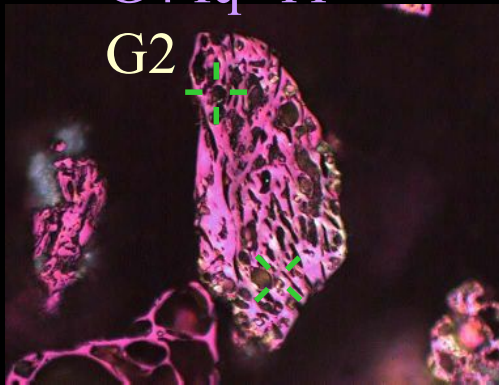


G4 fq=11



G4 fq=12

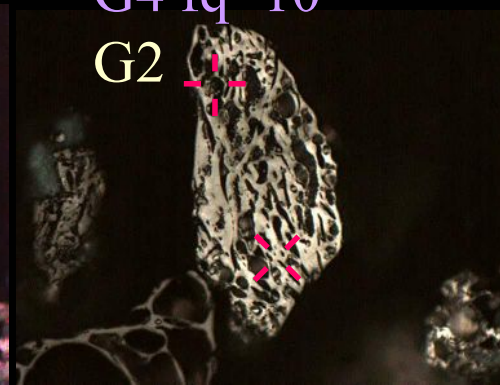
C26



G4 fq=11

G2

50  $\mu\text{m}$

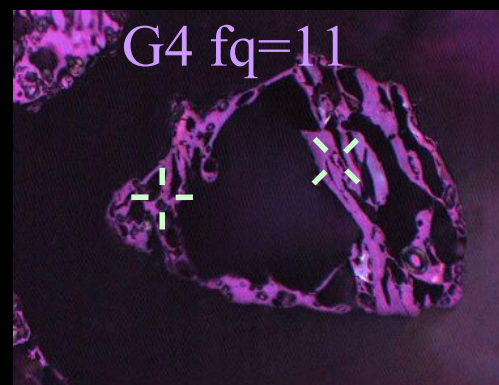


G4 fq=10

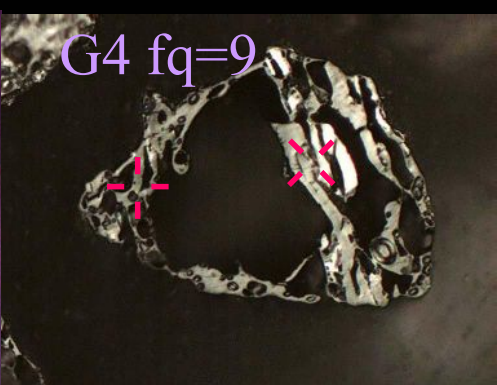
G2

50  $\mu\text{m}$

C28



G4 fq=11



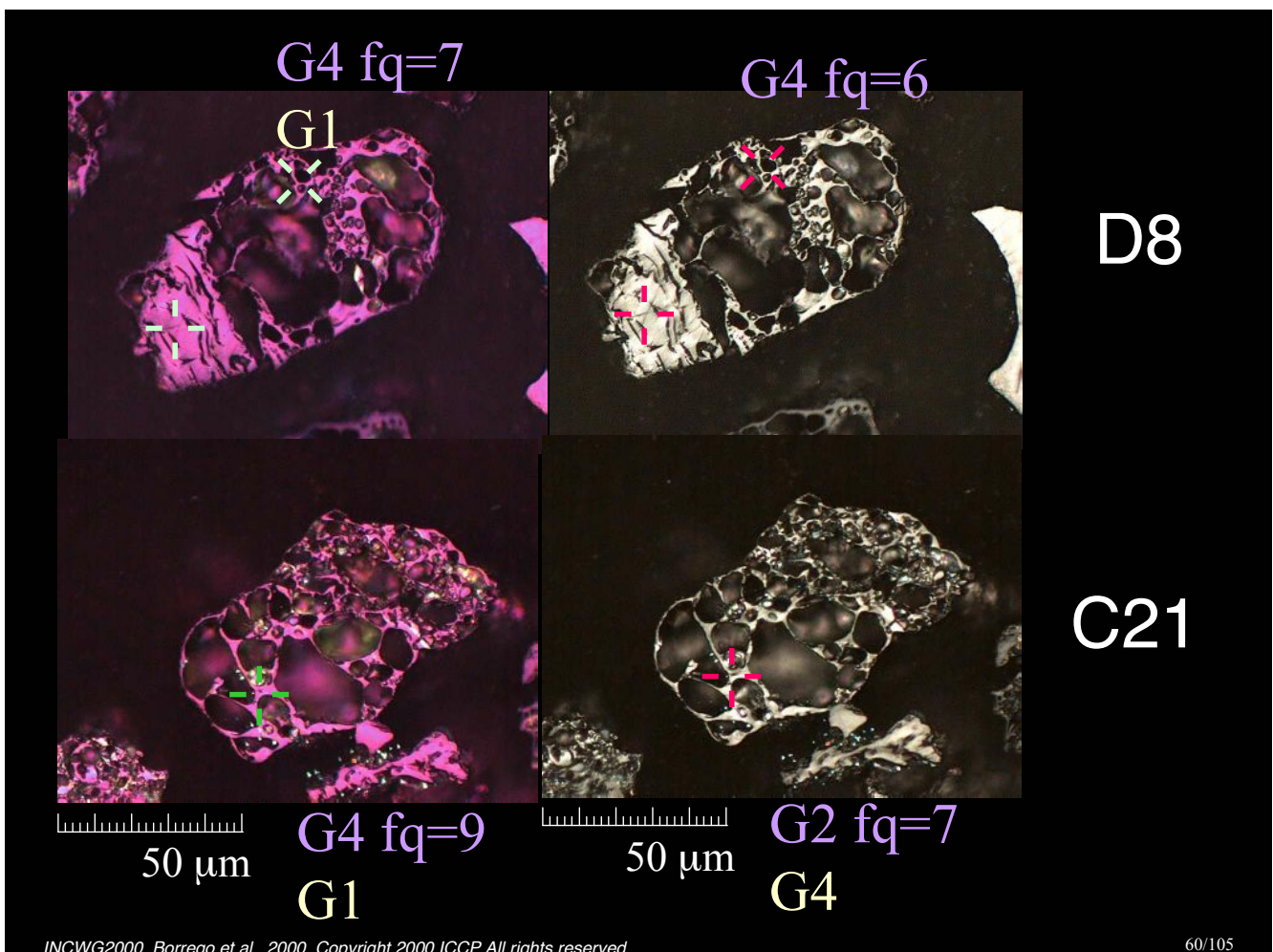
G4 fq=9

D5

G4 Sure identification  
(Agreement higher than 79 %)

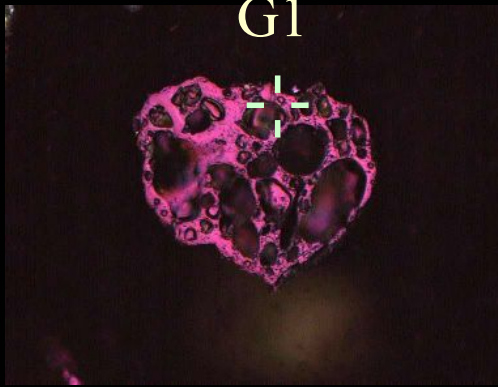
G4 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G4 Problems  
(2nd mode over 30%)



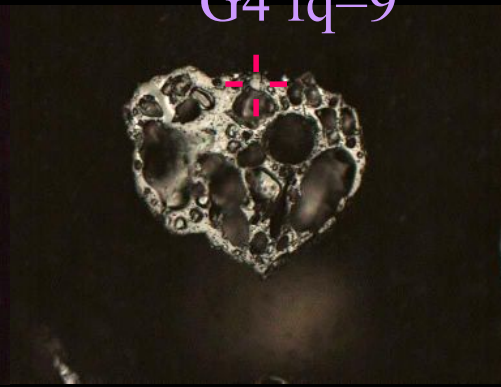
G4 fq=10

G1



50 μm

G4 fq=9

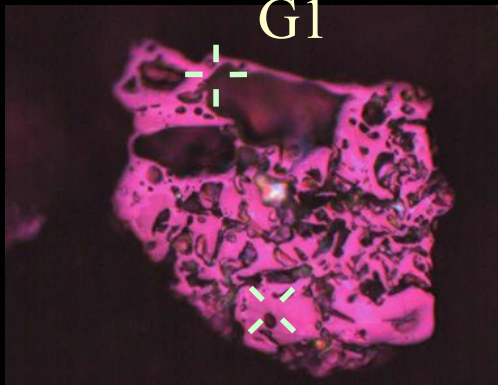


50 μm

C6

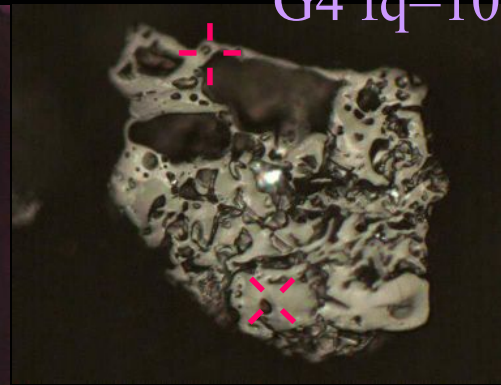
G4 fq=10

G1



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G4 fq=10

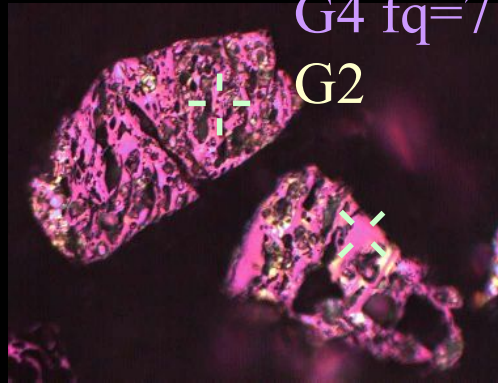


A7

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G4 fq=7

G2



50 μm

G2 fq=8

G4&G3

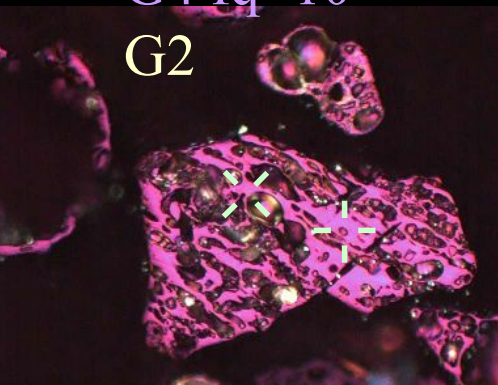


50 μm

C32

G4 fq=10

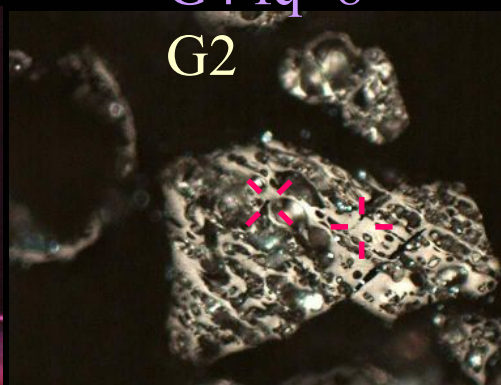
G2



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G4 fq=8

G2

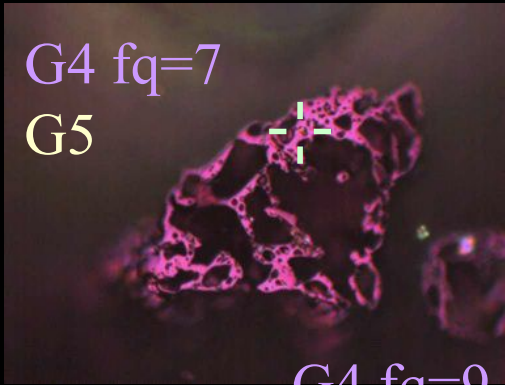


C19

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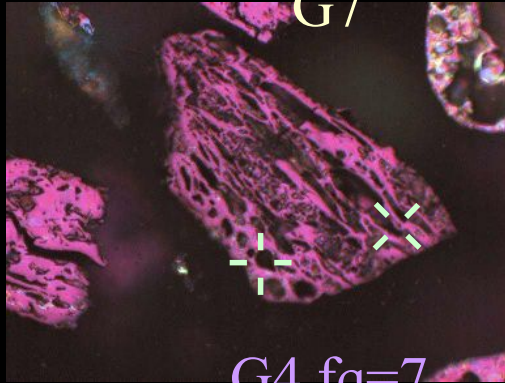
G4 fq=7

G5



G4 fq=9

G7



G4 fq=7

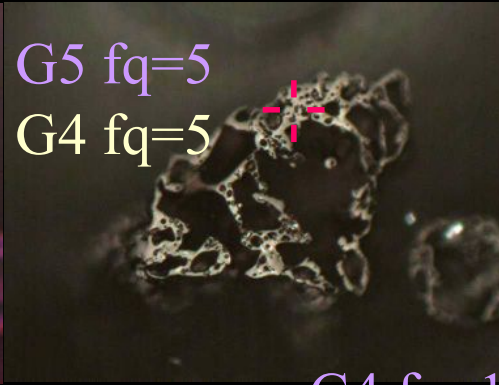
G2



50 μm

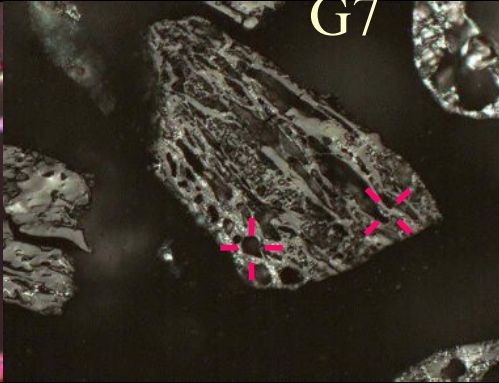
G5 fq=5

G4 fq=5



G4 fq=10

G7



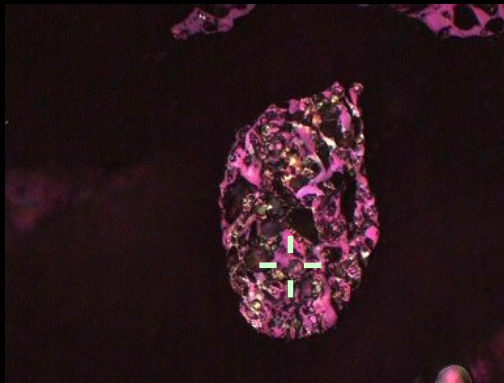
G2 fq=12



50 μm

A9

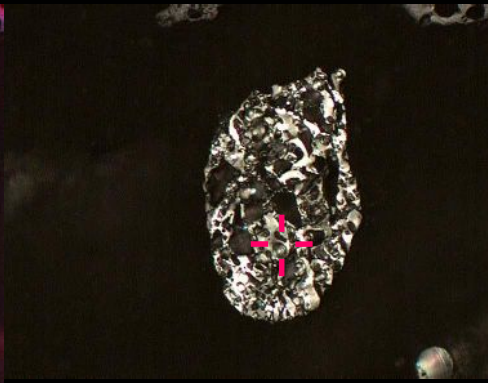
B23



50 μm

G4 fq=9

G4 fq=10

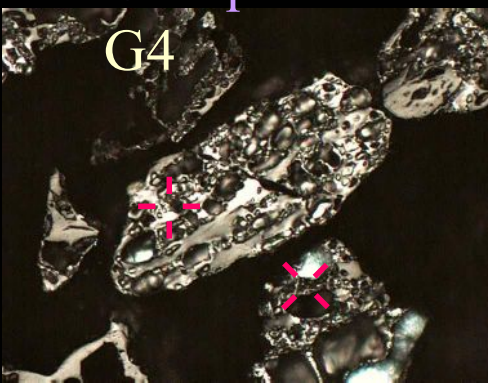
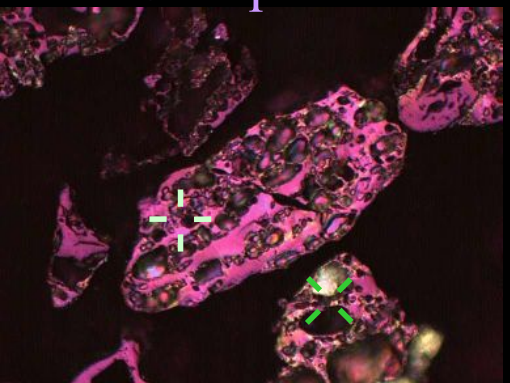


50 μm

G2 fq=8

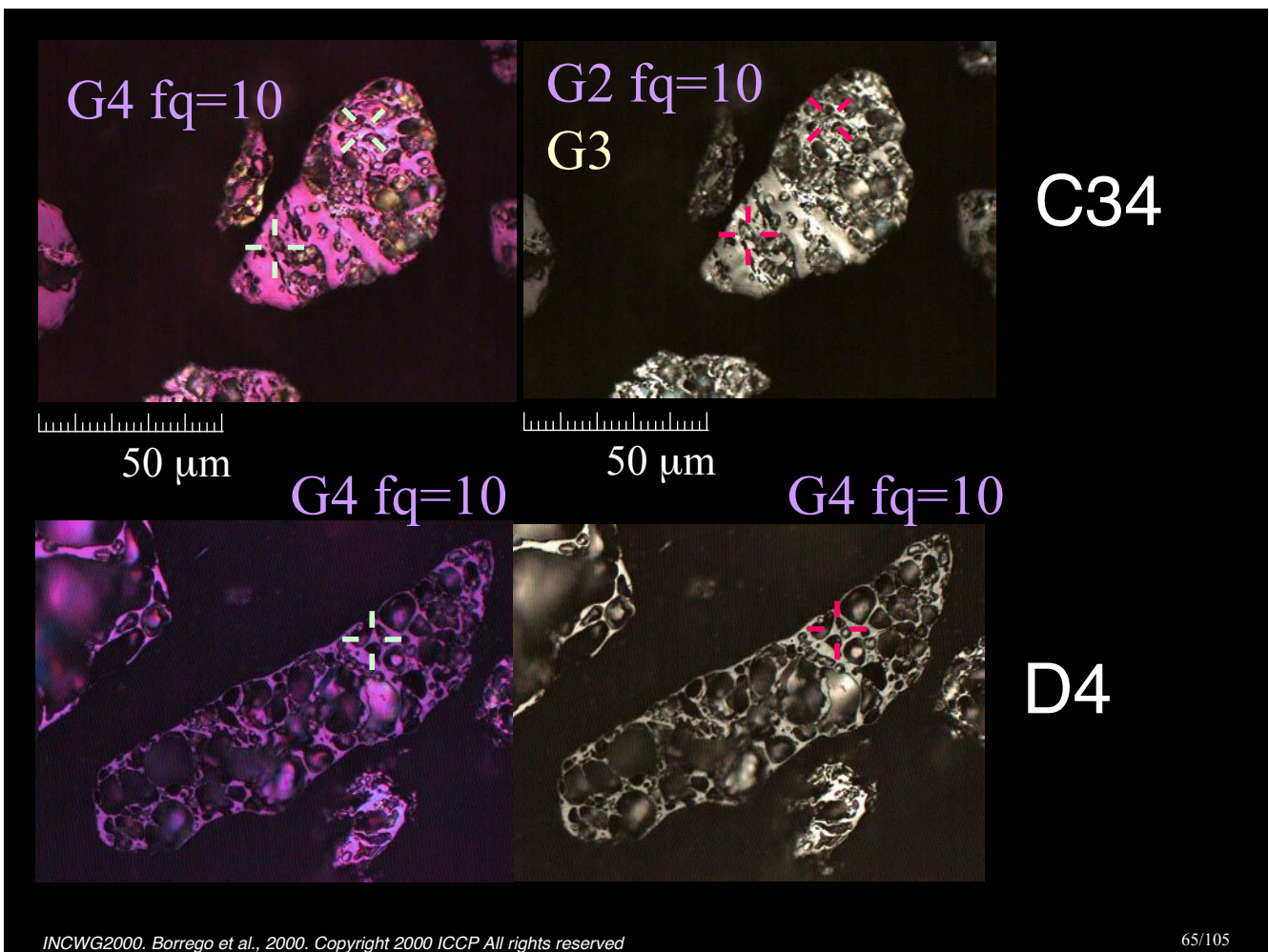
G4  
G2 fq=6

C7



C31

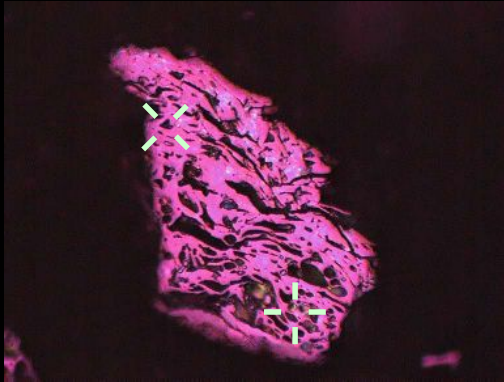




G4 Sure identification  
(Agreement higher than 79 %)

G4 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G4 Problems  
(2nd mode over 30%)



50  $\mu$ m

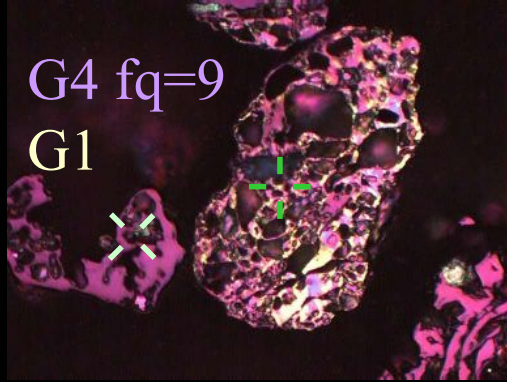
G4 fq=9  
G2



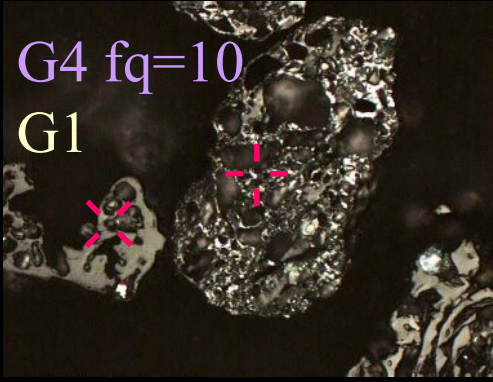
50  $\mu$ m

G4 fq=10  
G2

A4

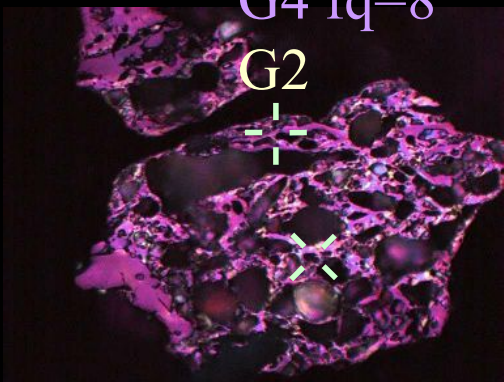


G4 fq=9  
G1

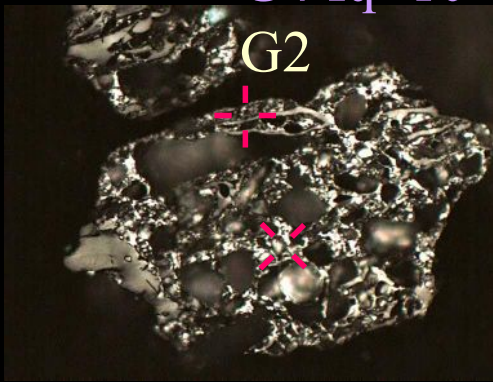


G4 fq=10  
G1

C35

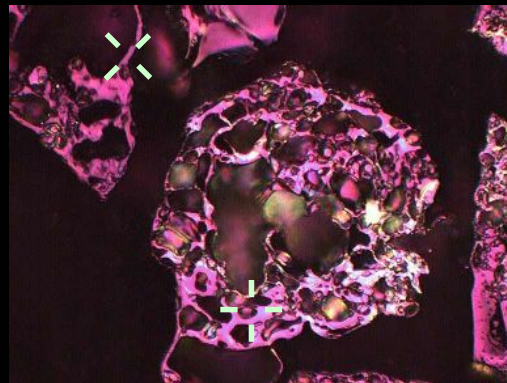


G4 fq=8  
G2



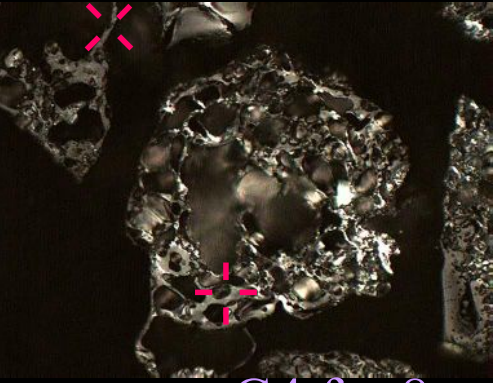
G4 fq=10  
G2

C23



50  $\mu$ m

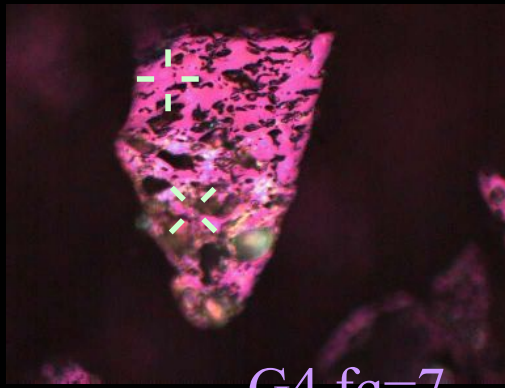
G4 fq=7  
G2



50  $\mu$ m

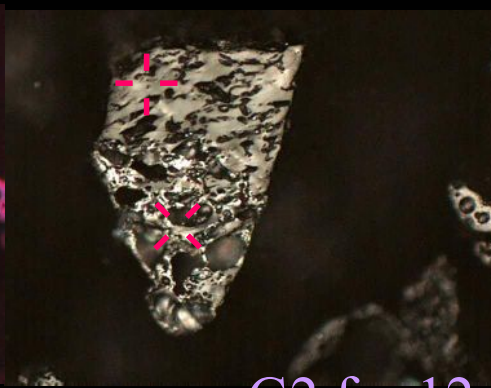
G4 fq=8  
G2

C12



50  $\mu$ m

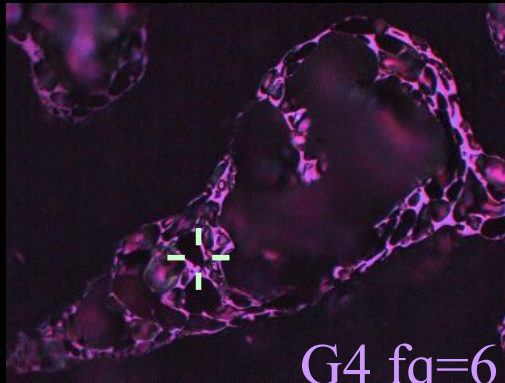
G4 fq=7  
G2



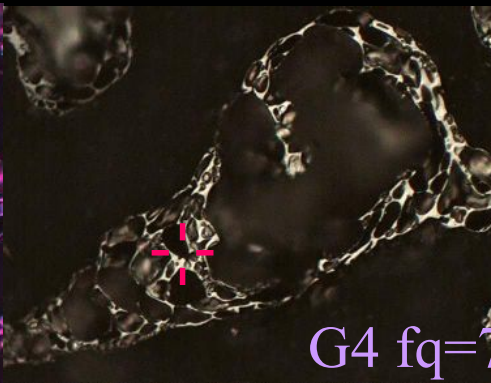
50  $\mu$ m

G2 fq=12

C17



G4 fq=6  
G1



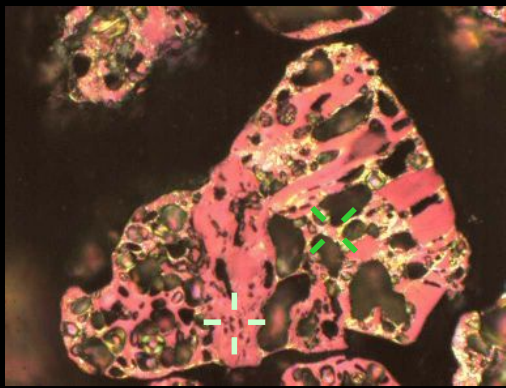
G4 fq=7  
G1

D6

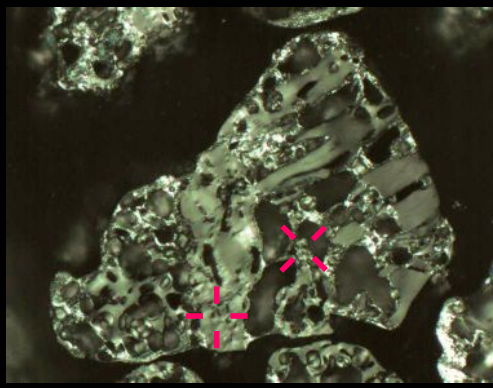
G5 Sure identification  
(Agreement higher than 79 %)

G5 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G5 Problems  
(2nd mode over 30%)

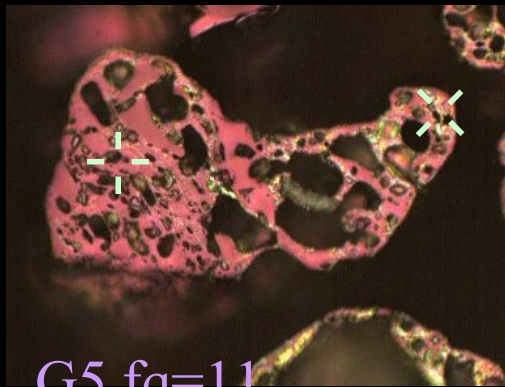


50  $\mu\text{m}$  G5 fq=12

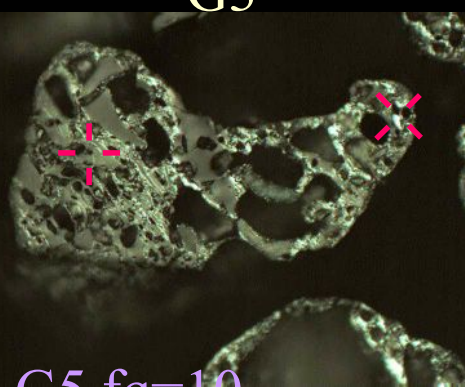


50  $\mu\text{m}$  G5 fq=7  
G3

B16

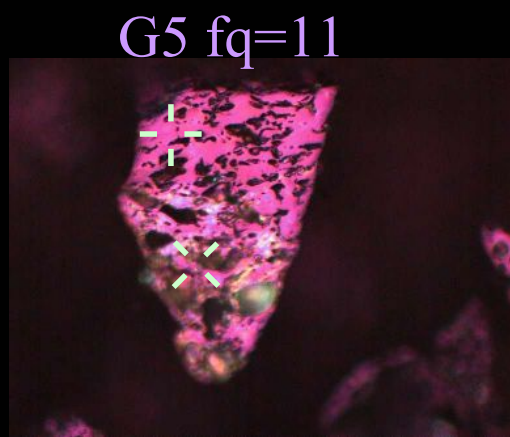


G5 fq=11



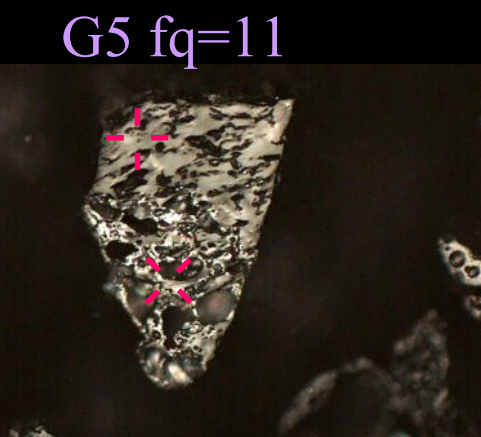
G5 fq=10

B4



G5 fq=11

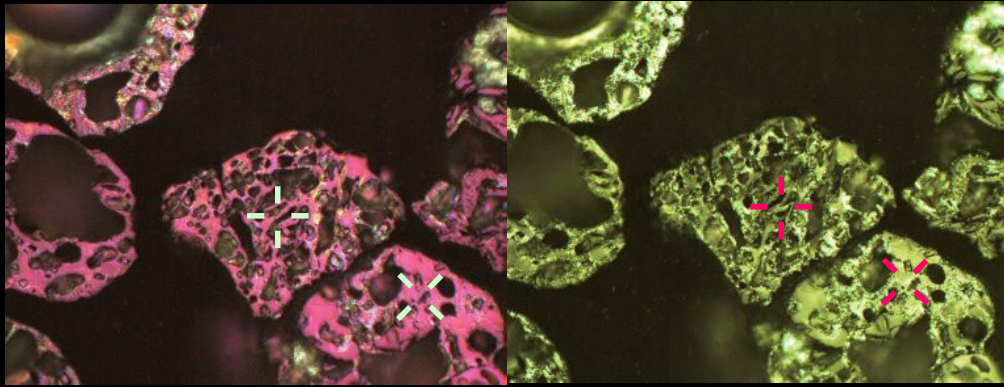
50  $\mu\text{m}$



G5 fq=11

50  $\mu\text{m}$

C17



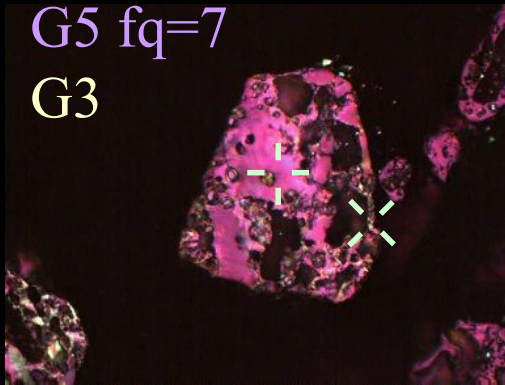
B12

50  $\mu\text{m}$

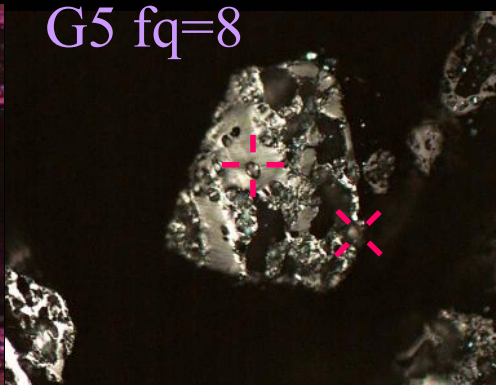
G5 fq=8  
G3

50  $\mu\text{m}$

G3 fq=8

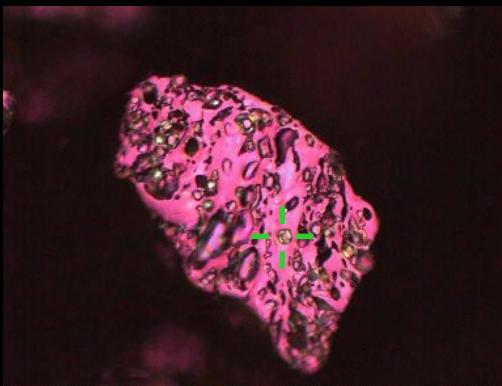


G5 fq=7  
G3



G5 fq=8

C20



50  $\mu\text{m}$

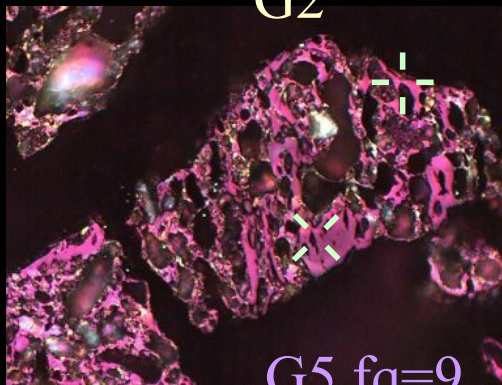
G5 fq=9  
G2



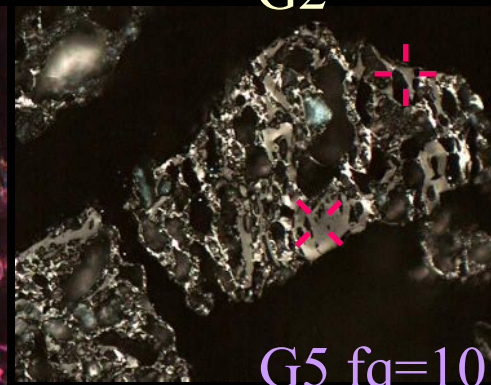
50  $\mu\text{m}$

G5 fq=8  
G2

C22



G5 fq=9  
G6

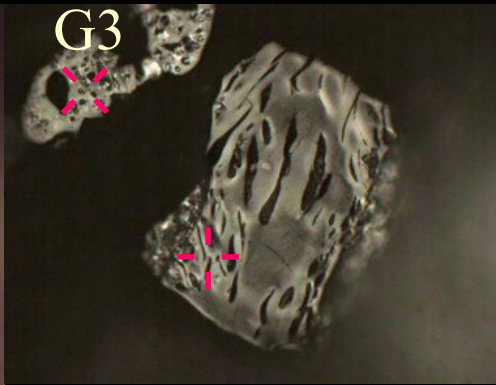
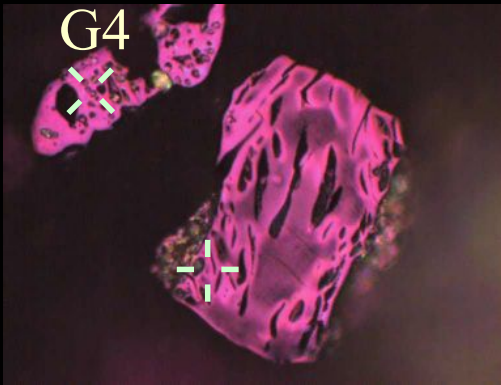


G5 fq=10

C29

G5 fq=10

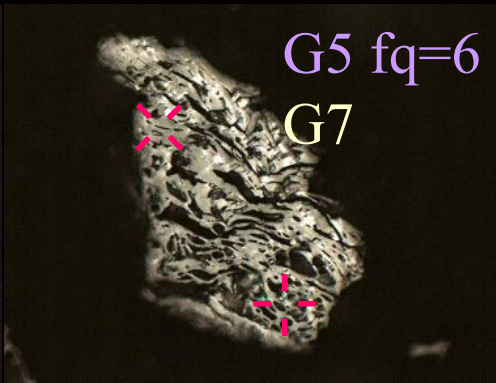
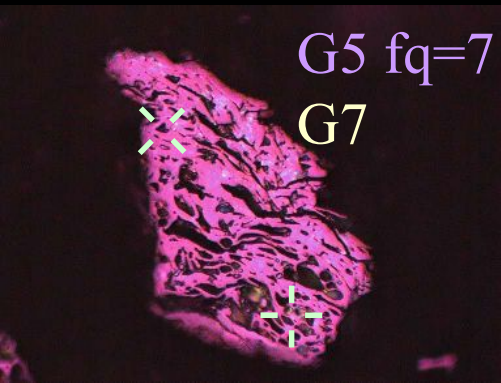
G5 fq=10



50  $\mu$ m

50  $\mu$ m

A1



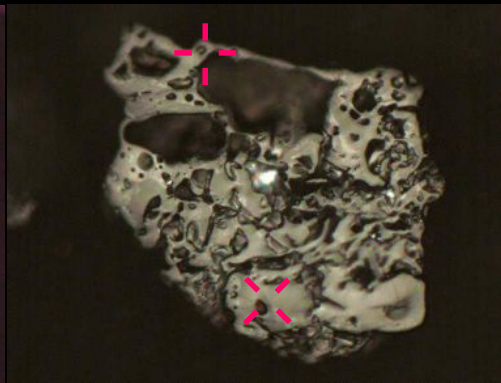
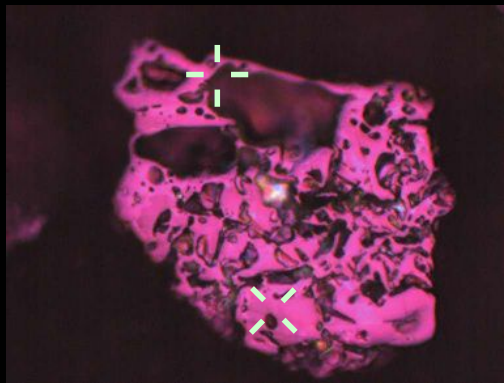
G5 fq=7

G5 fq=6

G7

G7

A4



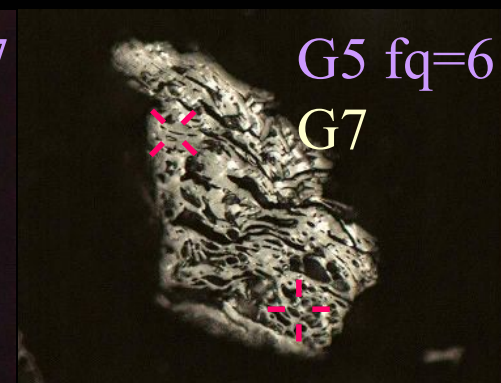
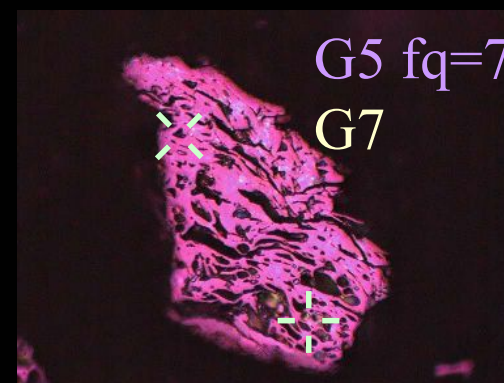
50  $\mu$ m

G5 fq=10

50  $\mu$ m

G6

A7



G5 fq=7

G5 fq=6

G7

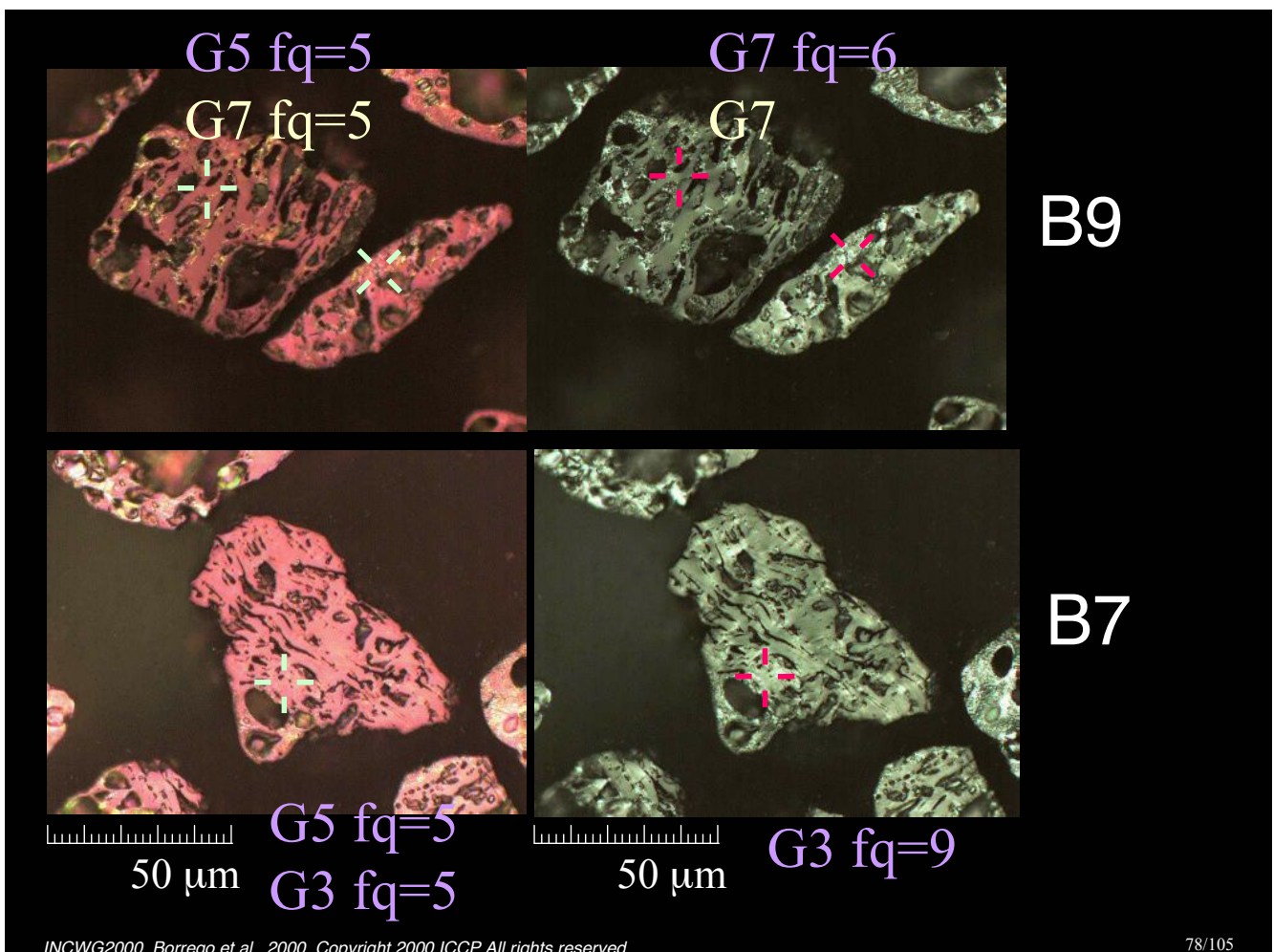
G7

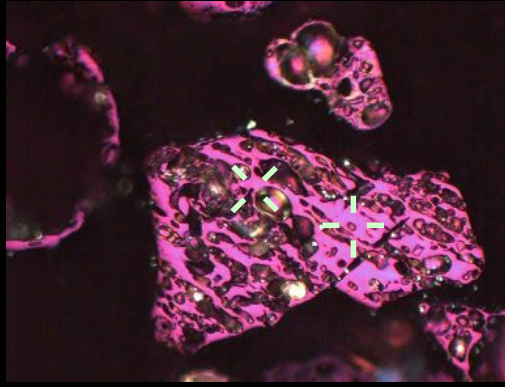
A4

G5 Sure identification  
(Agreement higher than 79 %)

G5 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

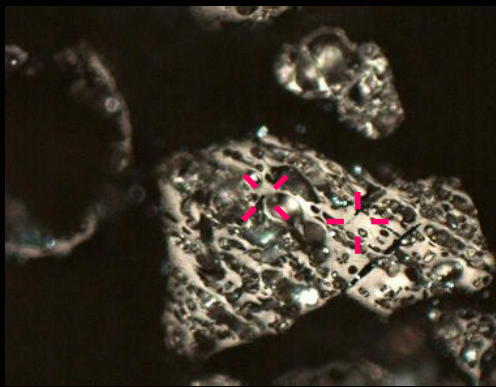
G5 Problems  
(2nd mode over 30%)





50  $\mu$ m

G5 fq=7  
G3



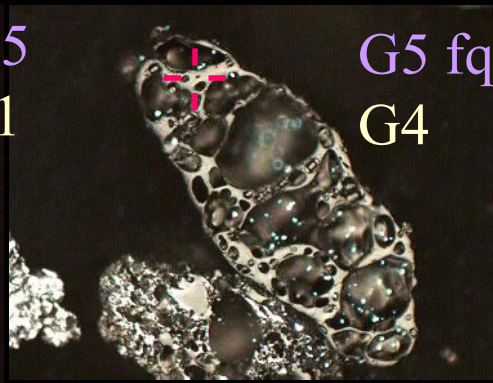
50  $\mu$ m

G5 fq=8

C19

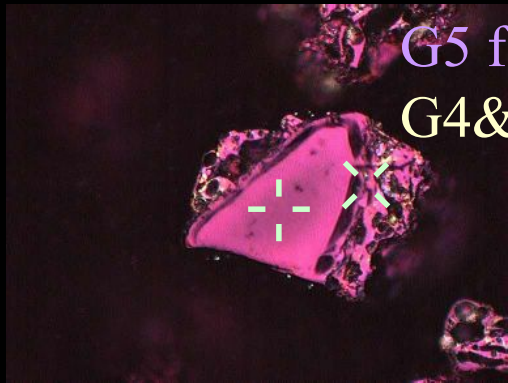


G5 fq=5  
G4&G1



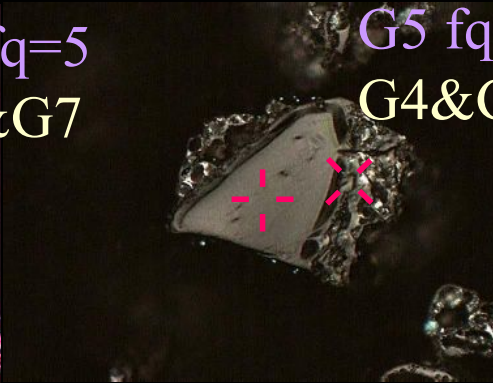
G5 fq=7  
G4

C9



G5 fq=5  
G4&G7

50  $\mu$ m



G5 fq=4  
G4&G7

50  $\mu$ m

C11

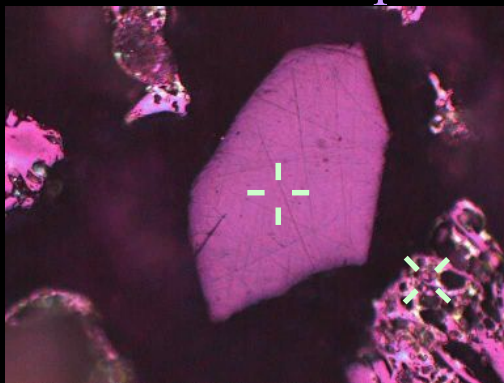


G6 Sure identification  
(Agreement higher than 79 %)

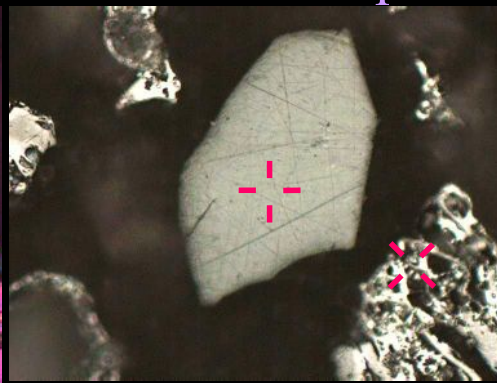
G6 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G6 Problems  
(2nd mode over 30%)

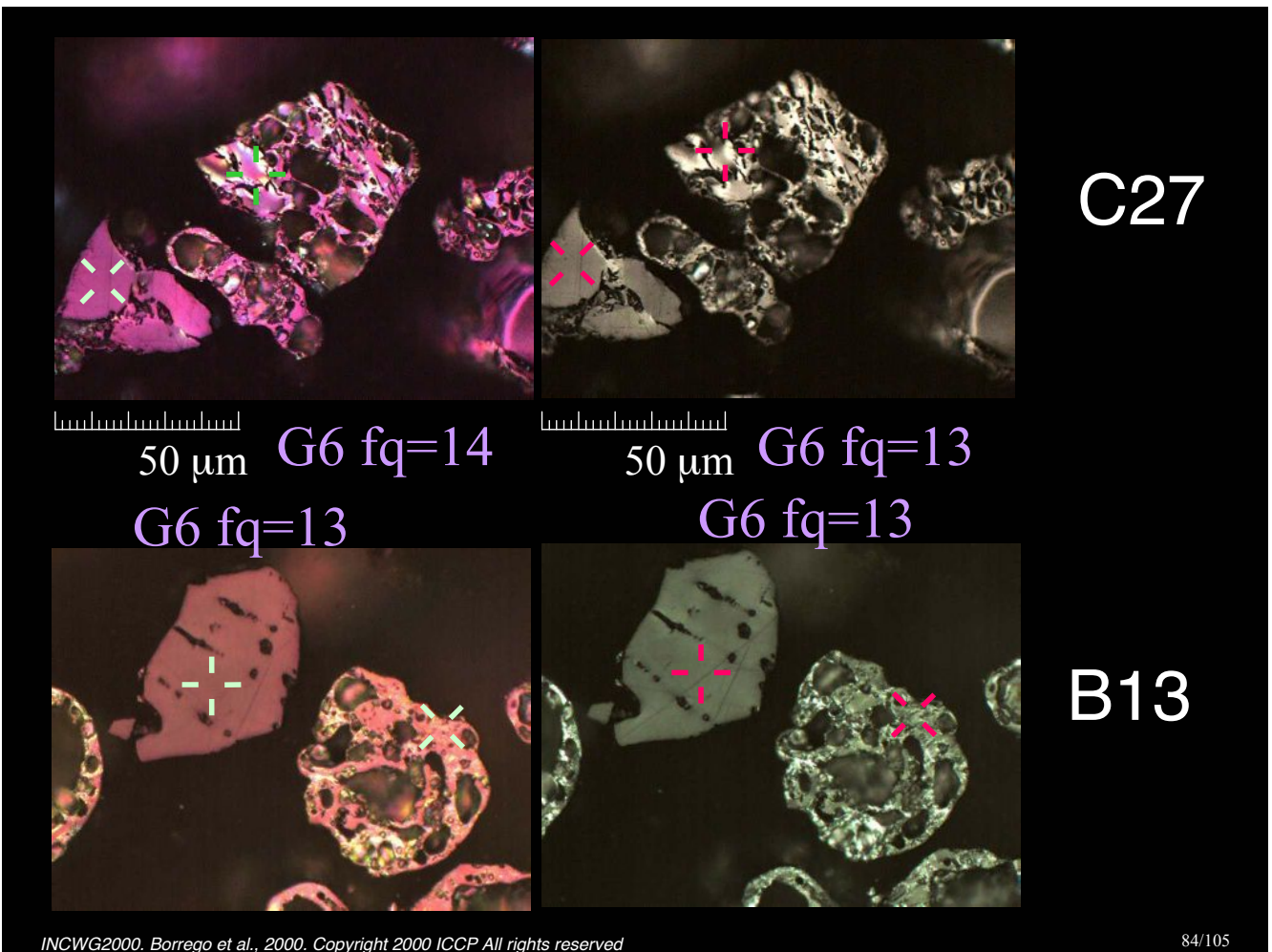
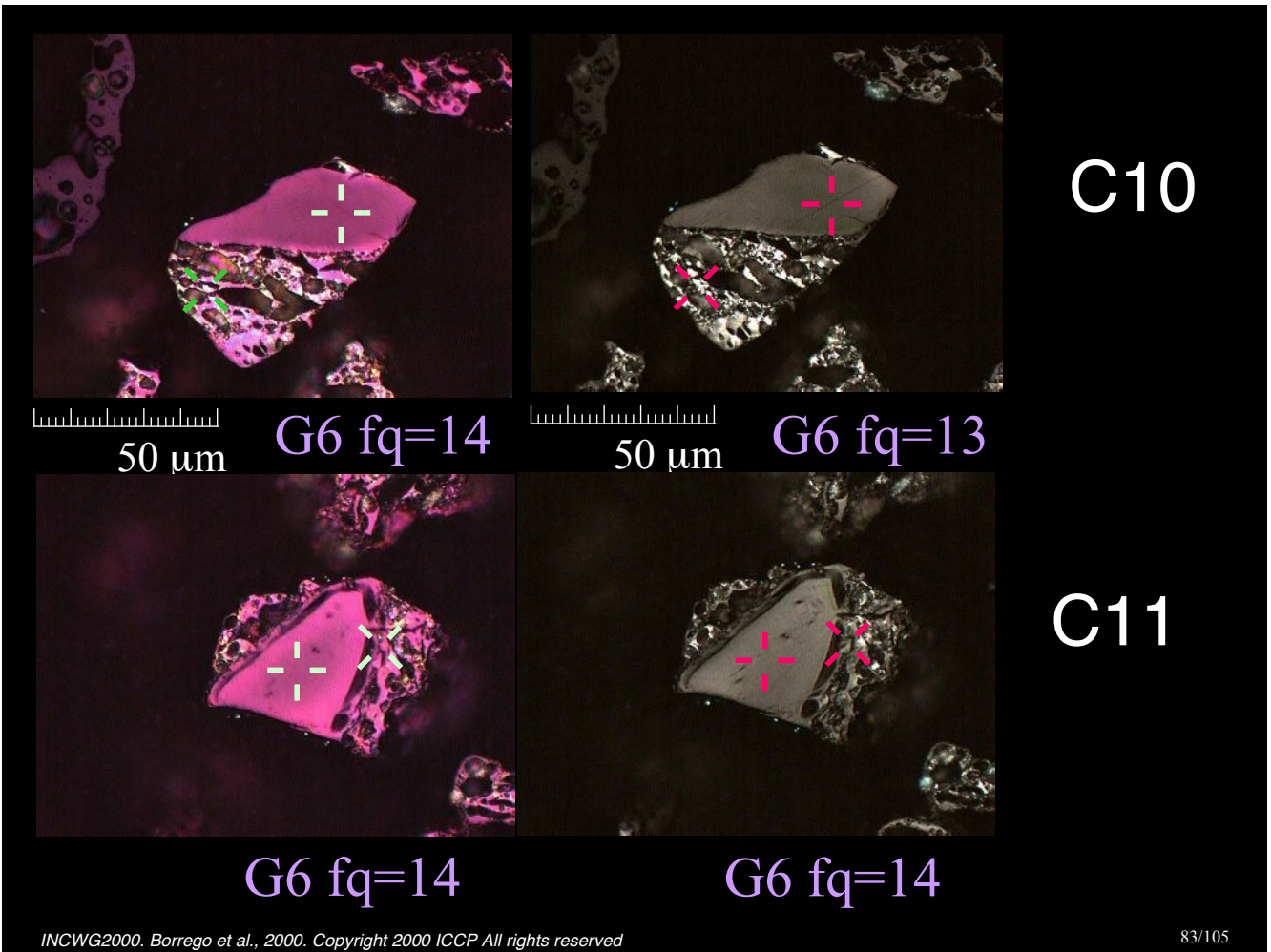
G6 fq=14

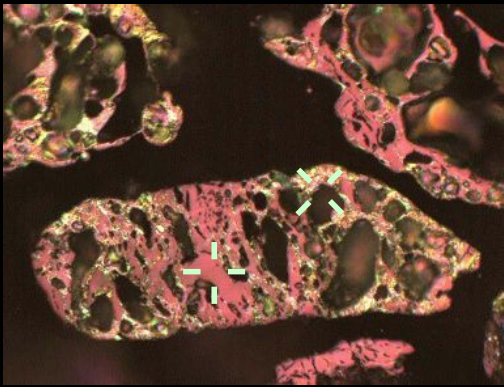


G6 fq=14

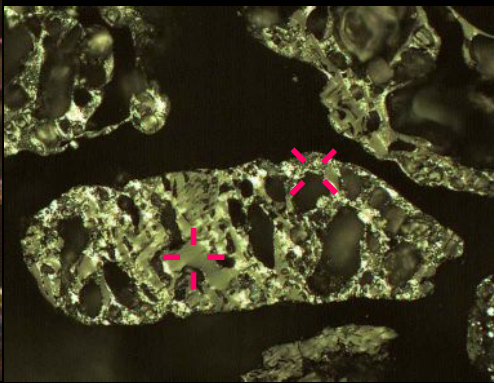


C18



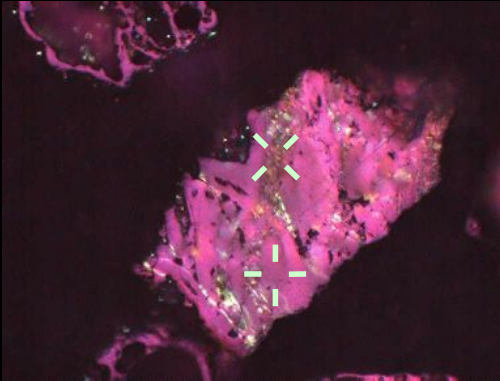


50  $\mu$ m G6 fq=12

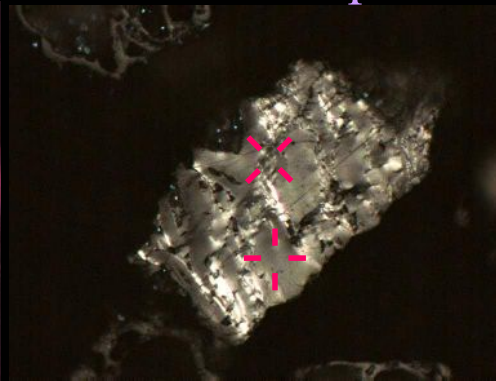


50  $\mu$ m G6 fq=11

B2

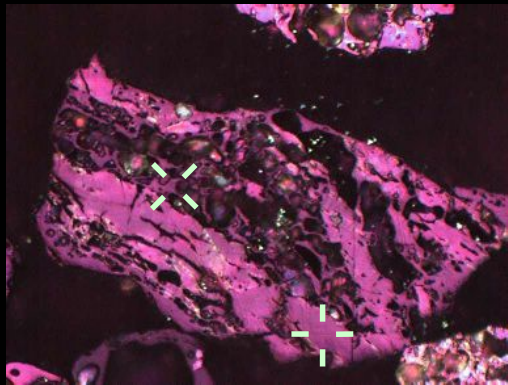


G6 fq=11

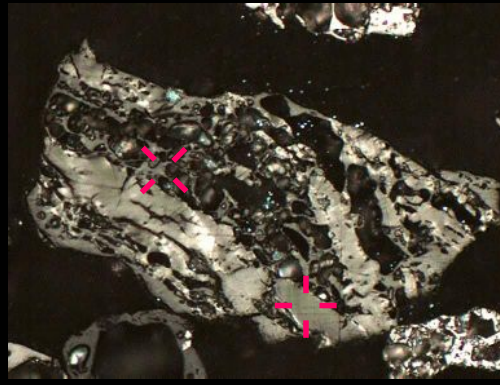


G6 fq=11

C14

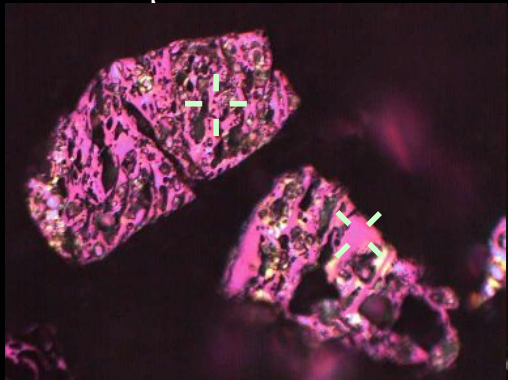


50  $\mu$ m G6 fq=11

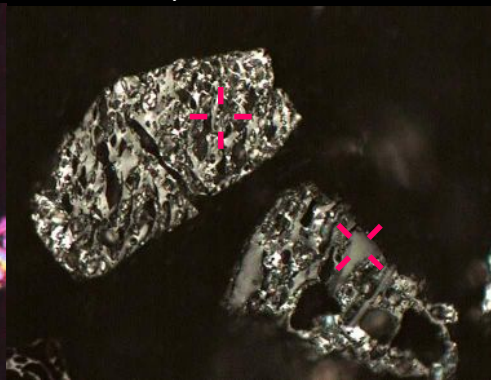


50  $\mu$ m G6 fq=12

C26



G6 fq=11



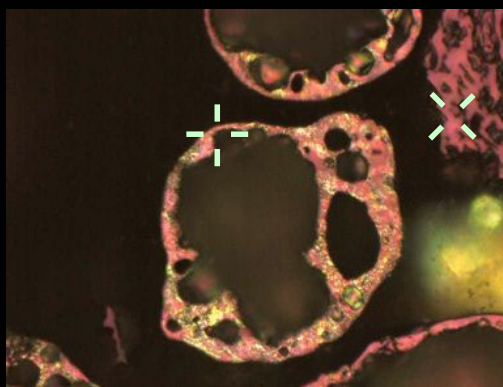
G6 fq=12

C32

G6 Sure identification  
(Agreement higher than 79 %)

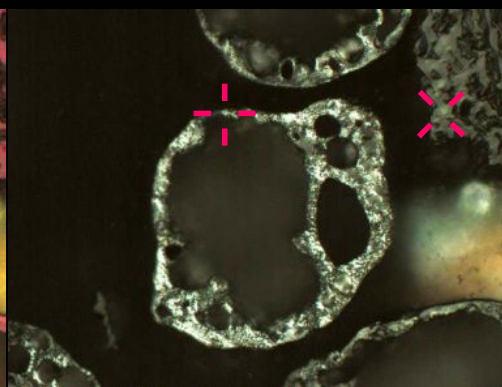
G6 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G6 Problems  
(2nd mode over 30%)



50  $\mu\text{m}$

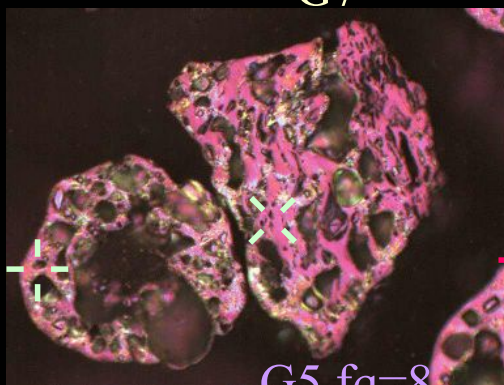
G5 fq=7  
G7



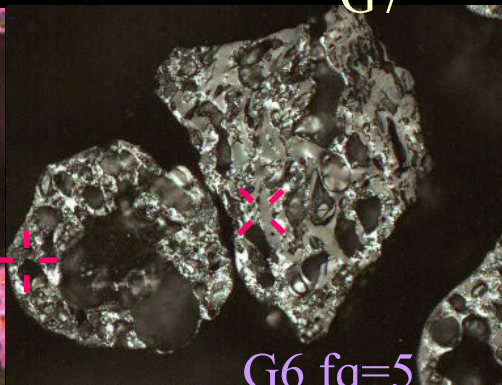
50  $\mu\text{m}$

G5 fq=7  
G7

B14

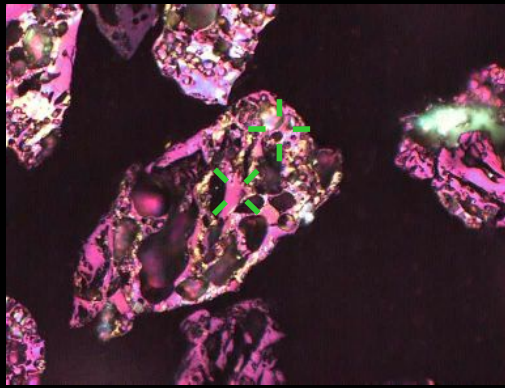


G5 fq=8  
G2



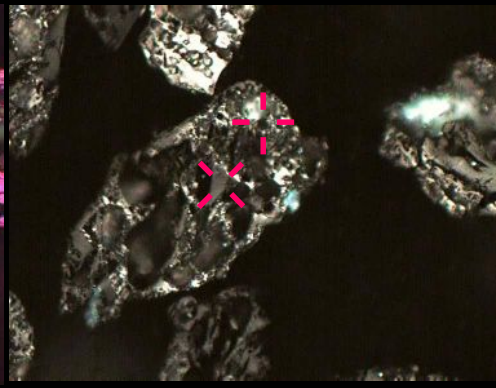
G6 fq=5  
G5 fq=5

B21



50  $\mu\text{m}$

G6 fq=8  
G5



50  $\mu\text{m}$

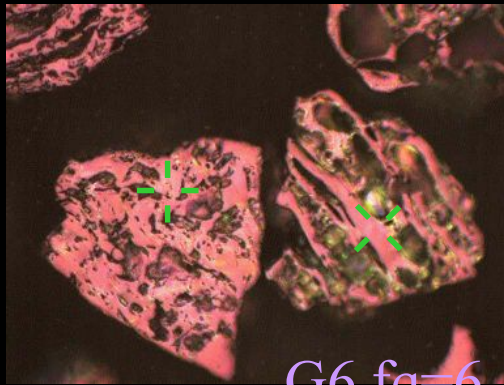
G6 fq=9  
G5

C33

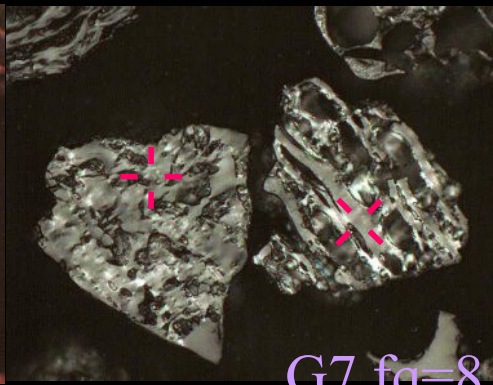
G6 Sure identification  
(Agreement higher than 79 %)

G6 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G6 Problems  
(2nd mode over 30%)

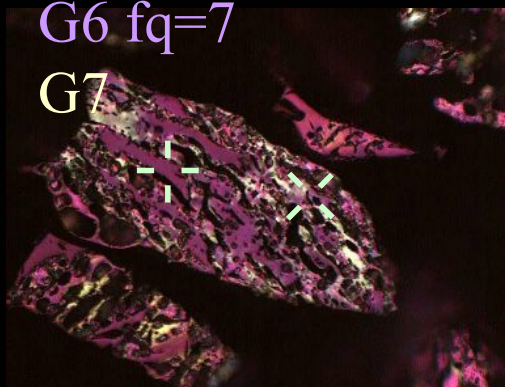


G6 fq=6  
G7

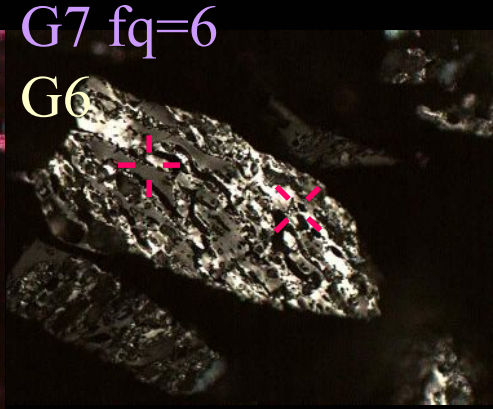


G7 fq=8  
G3

B26

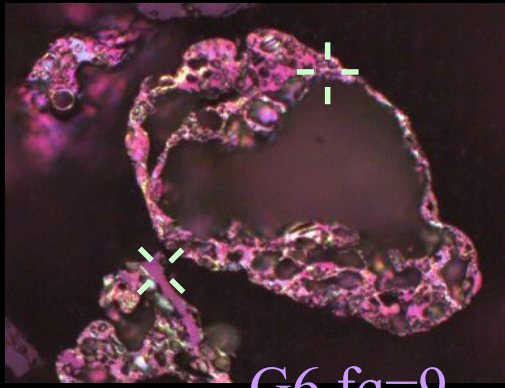


G6 fq=7  
G7

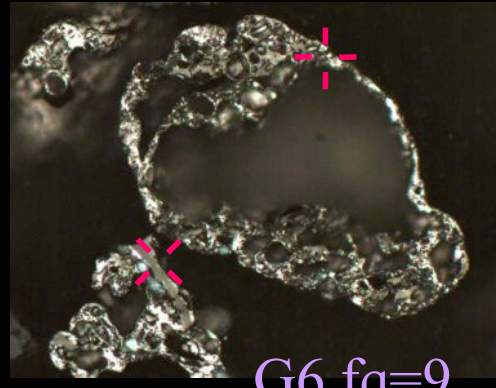


G7 fq=6  
G6

C13

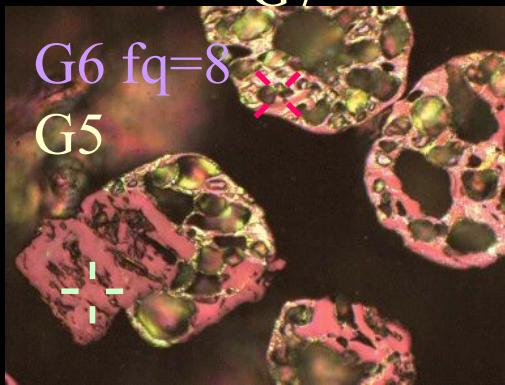


G6 fq=9  
G7

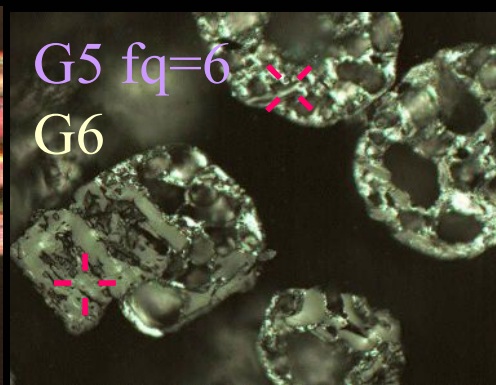


G6 fq=9  
G7

C4

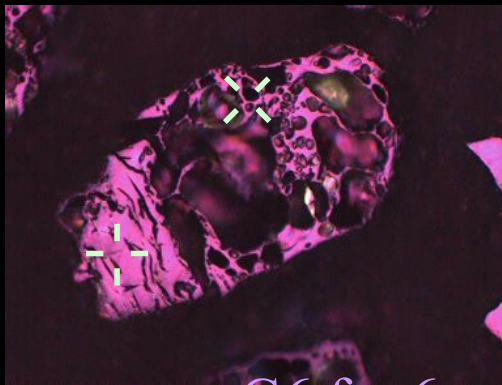


G6 fq=8  
G5



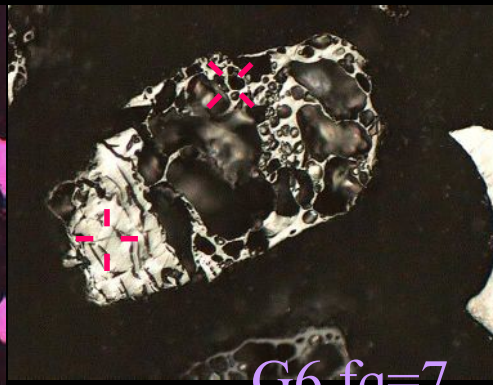
G5 fq=6  
G6

B10



50  $\mu\text{m}$

G6 fq=6  
G7



50  $\mu\text{m}$

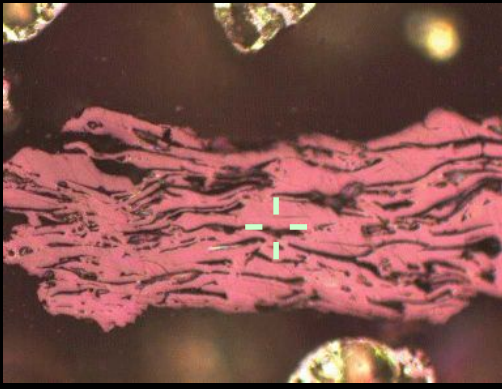
G6 fq=7  
G7

D8

G7 Sure identification  
(Agreement higher than 79 %)

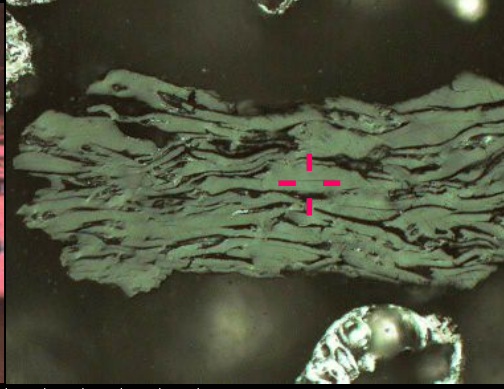
G7 Rather sure identification  
(Agreement 50-79% and 2nd mode  
under 30%)

G7 Problems  
(2nd mode over 30%)



50  $\mu\text{m}$

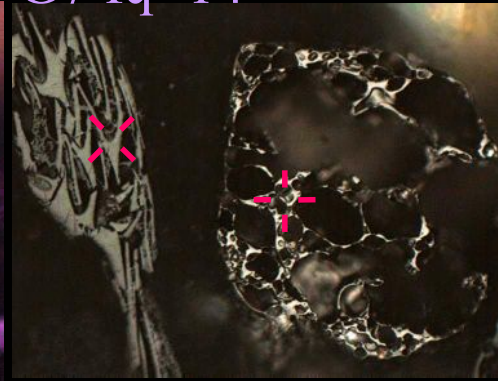
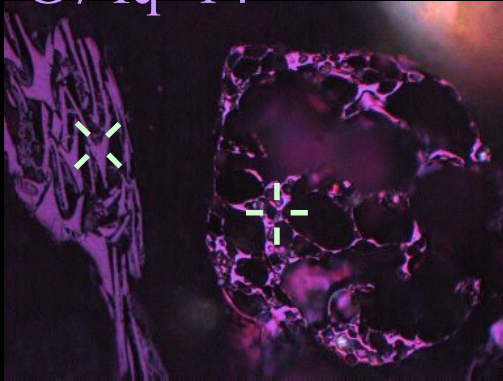
G7 fq=14



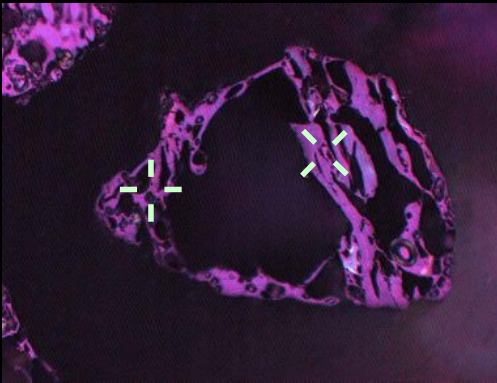
50  $\mu\text{m}$

G7 fq=14

B5

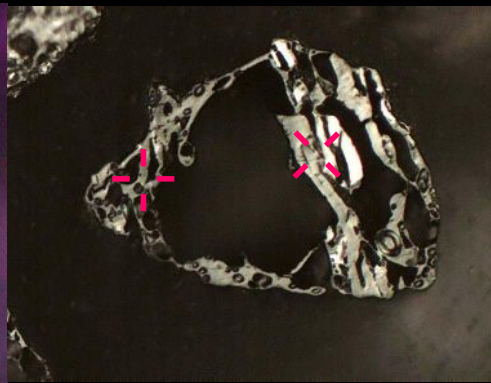


D2



50  $\mu\text{m}$

G7 fq=11

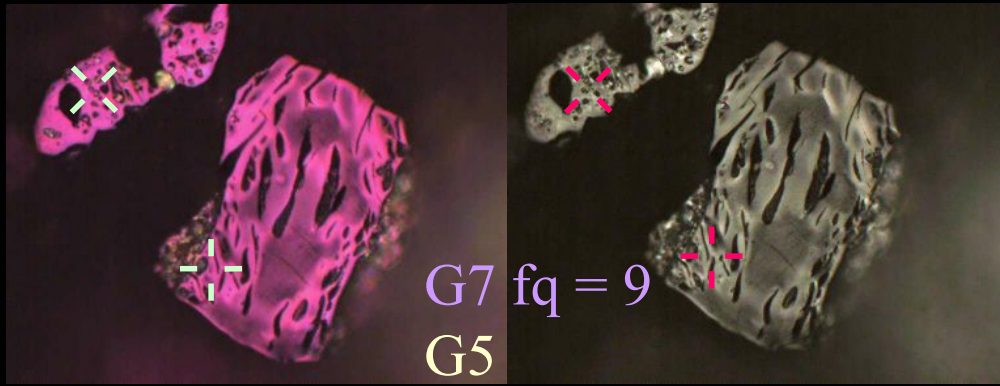


50  $\mu\text{m}$

G7 fq=10

D5





A1

G7 fq = 9  
G5



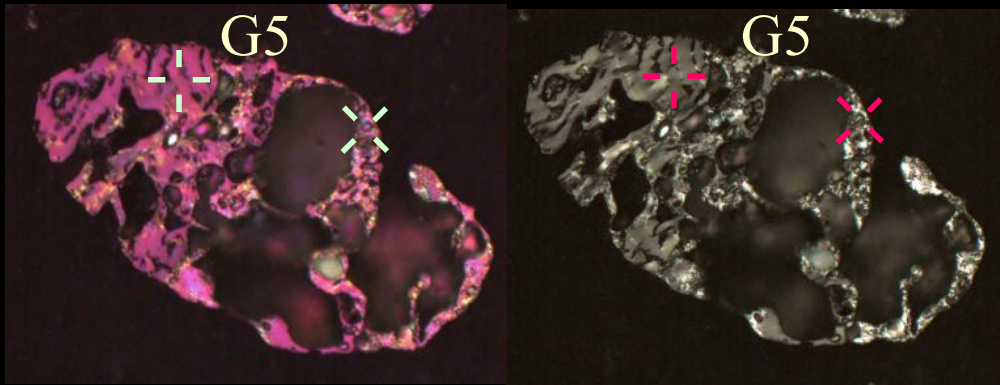
50 μm

G7 fq=9



50 μm

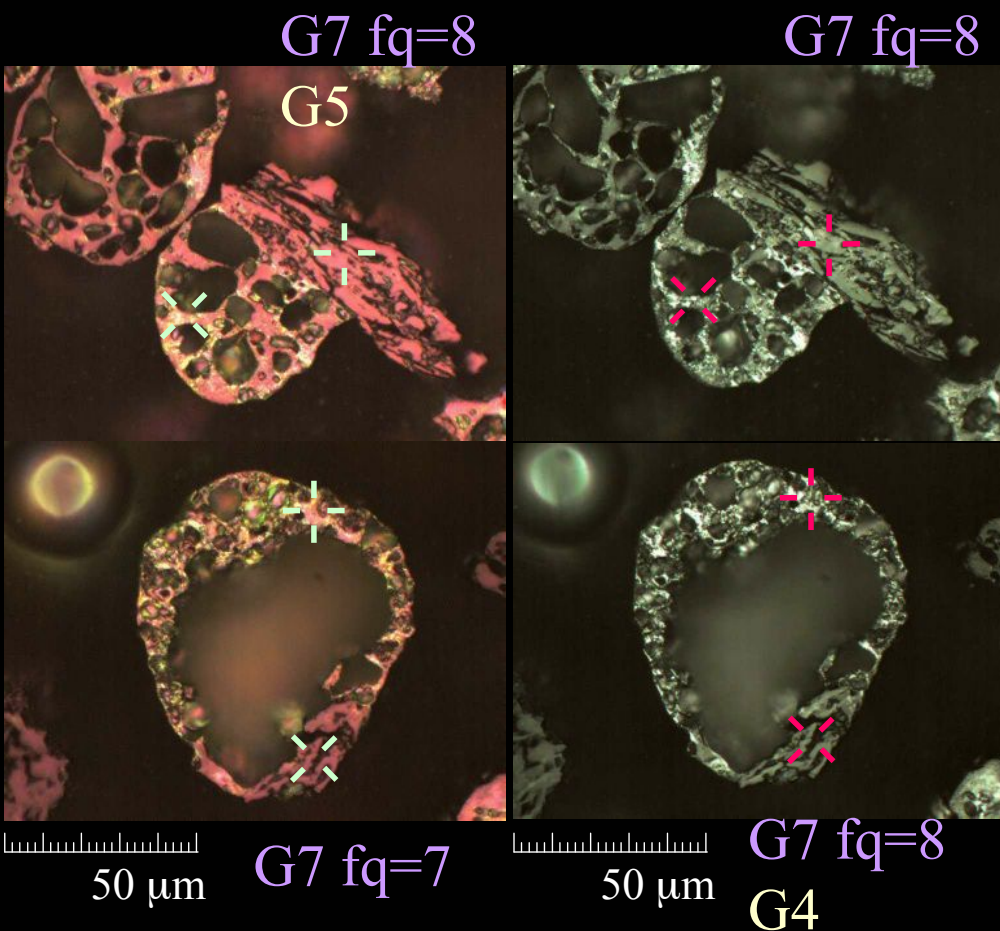
G7 fq=6



C1

G5

G5



G7 fq=8

G7 fq=8

G5

B15



50 μm

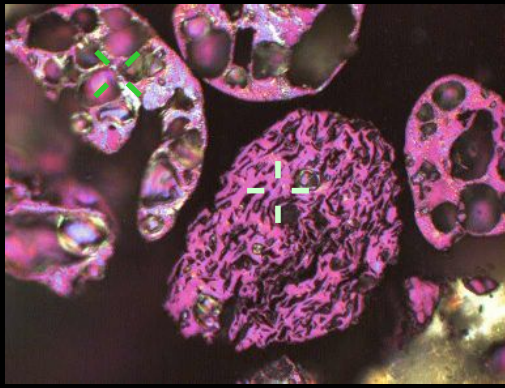
G7 fq=7



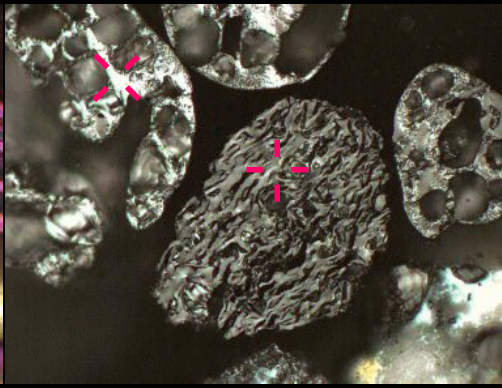
50 μm

G7 fq=8  
G4

B11

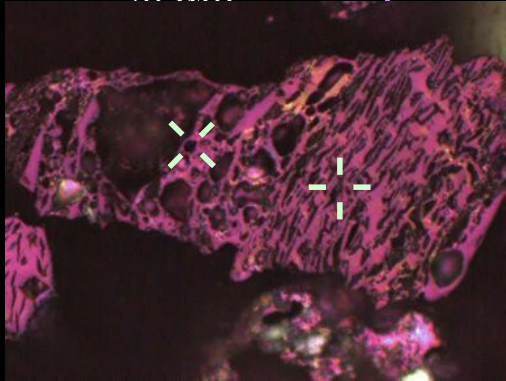


50  $\mu\text{m}$  G7 fq=9

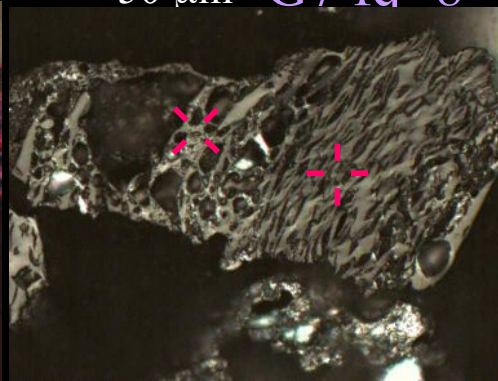


50  $\mu\text{m}$  G7 fq=8

B24

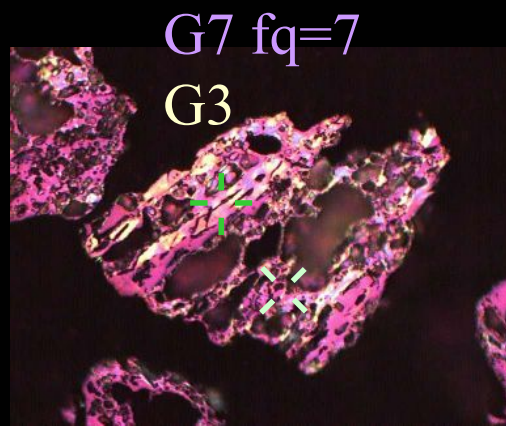


G7 fq=10

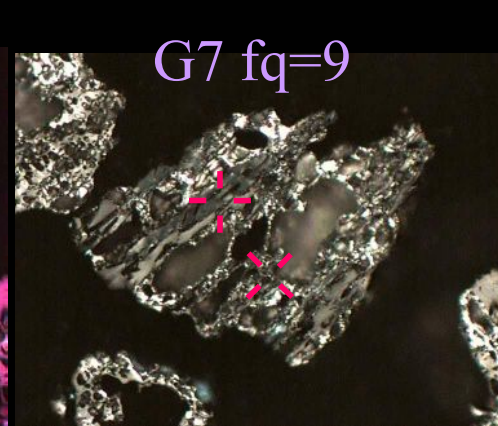


G7 fq=9

C2

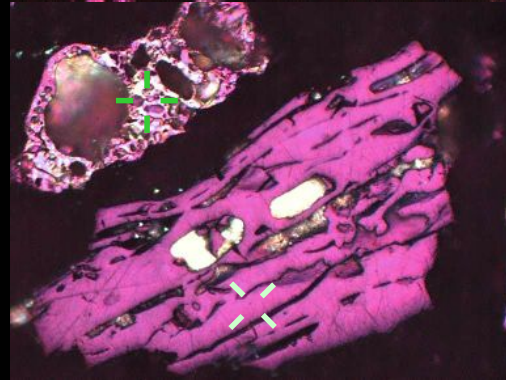


G7 fq=7  
G3

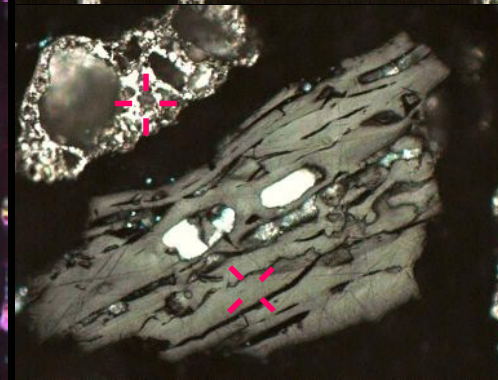


G7 fq=9

C25



50  $\mu\text{m}$  G7 fq=9  
G6



50  $\mu\text{m}$  G7 fq=9  
G6

C16

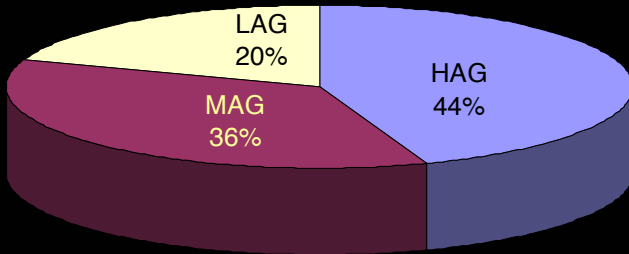
## Percentages of Fields with a given level of agreement

High Agreement (HAG)=  $\geq 79\%$

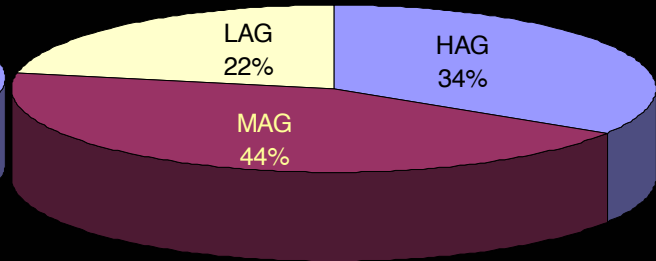
Medium Agreement (MAG)= 79-50 %

Low Agreement (LAG)=  $\leq 50\%$

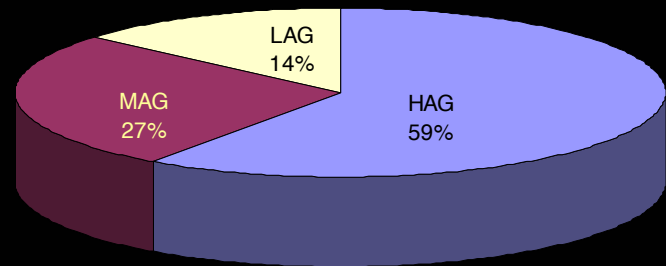
### With retarder plate



### Partially crossed nicols



### INCWG 1999 Exercise



## Percentage of Fields according to mode

Percentage of fields according to mode		
Participant	With retarder	No retarder
5	78.2	72.5
13	77.5	81.0
10	81.0	78.2
4	73.2	62.7
9	<b>36.6</b>	<b>37.3</b>
11	66.9	64.1
6	84.5	83.8
14	74.6	69.0
3	69.0	67.6
1	66.2	59.2
15	71.1	68.3
16	69.7	64.8
17	78.9	76.8
18	<b>60.6</b>	<b>48.6</b>

*The level of agreement was overall high with only two participants having poorer results*

## Coincidence between identifications with and without retarder plate

Participant	(%)
5	68.3
13	78.2
10	71.1
4	72.5
9	54.9
11	97.2
6	88.0
14	67.6
3	78.9
1	65.5
15	97.2
16	83.1
17	90.8
18	46.5

-In 83.8 % fields modal values were maintained although illumination changed

-In 77.8 % fields less than 30% people changed the mind with different illuminations

-In 22.2 % fields less than 30% people changed the mind with different illuminations

-In 52.8% fields frequency of mode was higher using retarder plate (colour) than without

In 17.6% fields more than 20% participants changed from inertinite-derived isotropic porous to anisotropic porous (G4-G2) or viceversa with illumination

In 0.7% fields more than 20% participants changed from inertinite-derived isotropic dense to anisotropic dense (G5-G3) or viceversa with illumination

## Analysis of Fails with and without retarder plate

	Fails when Agreement was higher than 79%		Fails when agreement was between 79% & 50%		Fails when Agreement was < 50%	
	With Retarder	Without Retarder	With Retarder	Without Retarder	With Retarder	Without Retarder
5	2.8	0.7	25.4	27.5	4.9	3.5
13	2.1	1.4	31.7	19.0	3.5	9.2
10	2.8	2.8	26.1	21.8	6.3	7.0
4	2.1	3.5	29.6	37.3	4.9	2.8
9	23.9	17.6	69.7	62.7	7.7	6.3
11	4.9	3.5	40.8	35.9	9.2	7.7
6	0.0	0.0	19.7	16.2	5.6	4.2
14	2.1	0.7	35.2	31.0	4.2	9.9
3	5.6	3.5	33.1	32.4	6.3	17.6
1	6.3	4.9	39.4	40.8	7.0	0.0
15	7.7	4.9	39.4	31.7	10.6	26.1
16	4.2	0.7	30.3	35.2	5.6	0.0
17	0.7	3.5	19.7	23.2	6.3	0.0
18	11.3	13.4	39.4	51.4	5.6	0.0

# Conclusions

- Illumination has influence mainly in the identification of isotropic/anisotropic and porous/dense
- A significant part of the discrepancies between identifications using and not using retarder plate are nevertheless due to variable criteria
- Vitrinite-derived material is virtually indistinguishable from either isotropic or anisotropic porous inertinite unless it is found as cenospheres
- The percentage of fields classified according to modal values were lower than in the 1999 results.