

# CORONA MINERALS

## CHAMONIX ZINC PROSPECT Mineragraphy

March 2014

**MODA**  
microscopy

McArthur Ore Deposit Assessments Pty Ltd

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## CORONA MINERALS

### CHAMONIX ZINC PROSPECT

#### MINERAGRAPHY

March 2014

## Method

Two preliminary drillcore samples from Corona Minerals' Chamonix Zinc Prospect in the Linda Valley near Queenstown (11315M: CZD003 5.75m; 11323M: CZD003 8.30m) were submitted for routine mineragraphy. Polished thin sections were prepared by Simon Stephens (CODES, UTas) and offcuts submitted for assay by ALS Burnie.

The assessment was undertaken in two stages: quantitative and qualitative.

To measure the mineralogical composition of each sample, a type of point counting was implemented whereby a nominal 53µm circular mask on a uniform grid allowed collection of quantitative data on 400 points per sample, spread over the entire area of the polished thin section. At each of the 400 grid points, the area% of each mineral present was visually estimated. The minerals logged were: *pyrite* (Py), *sphalerite* (Sp), *galena* (Gn), *chalcopyrite* (Cp), *tetrahedrite* (Te) and *gangue* (*sericite*, *quartz*, *clays*, *carbonaceous matter*, etc.; Ga). In addition, a schematic textural diagram or icon was chosen to represent each "virtual grain" logged – these are presented as coloured grain maps. The standard mineral liberation and association parameters for the 53µm virtual grind were computed and presented in summary spreadsheet form.

The whole slides were then examined qualitatively and examples of the textures present were photographed at various scales. These images were annotated using PowerPoint.

## Composition

### *Chamonix Drillcore Volume% Composition*

Sample	Py	Sp	Gn	Cp	Te	Ga
11315M	3.3	37.1	Tr	0.1	Tr	59.5
11323M	38.9	1.1	Tr	0	0	60.0

*Py=pyrite, Sp=sphalerite, Gn=galena, Cp=chalcopyrite, Ga=gangue. Tr means <0.05%*

### *Chamonix Drillcore Grades from mineralogy and assay lab*

Sample	Grades from mineralogy				Offcut lab assays							
	%Cu	%Pb	%Zn	%Fe	%Cu	%Pb	%Zn	%Fe	ppm Ag	ppm Au	%S	%C
11315M	0.05	0.01	28.4	5.3	0.02	0.05	28.6	7.4	25	0.06	23.4	3.57
11323M	0	0.08	0.79	25.7	0.01	0.13	0.66	34.0	12	0.04	38.5	3.30

The gangue minerals are (in order of predominance):

- Ultrafine-grained *sericite*
- *Quartz* (as anhedral grains in sericite, and deformation-induced fibres)
- Unidentified *clays*
- *Carbonaceous matter* (as ultrafine flakes and minor remobilised material)

## Textures

### 11315M

This slide is dominated by massive remobilised moderate-Fe *sphalerite* (with minor *pyrite* and *chalcopyrite* inclusions), areas of an unusual complex intergrowth of *sphalerite*, *sericite* and *quartz*, and disrupted bands of weakly *carbonaceous* shale with fine-grained *pyrite*. There is evidence of brecciation and disruption after the *sphalerite* remobilisation.

### 11323M

This slide is of a markedly different composition compared to the first slide, consisting of a highly disrupted and brecciated mix of annealed *pyrite* fragments (with minor interstitial *sphalerite*) and fibrous *quartz* debris set in a chaotic matrix of leached and weakly *carbonaceous* shale with abundant fine-grained *pyrite*. The shattering and brecciation in this rock clearly occurred after development of the fibrous *quartz*.

## Liberation - Sphalerite

*Chamonix Drillcore Sphalerite Distribution% at 53µm "grind"*

Sample	Free	Binary with					Ternary
		Py	Gn	Cp	Te	Ga	
11315M	50	1	0	2	1	29	18
11323M	0	19	0	0	0	10	71

## Concluding Remarks

With no knowledge of the geologic setting, it is difficult to come to any meaningful conclusions based on just these two samples. However, the extent of brecciation and disruption in both suggests they come from a sulphide-rich faulted zone.

G.J.McArthur PhD FAusIMM MMICA MSEG

Principal Mineralogist

17.3.14

PROJECT	T0738
DATE	170314
TECHNICIAN	DK

Sample Description	Sample Number	Preparation	AAS Cu %	AAS Pb %	AAS Zn %	AAS Fe %	AAS As %	Ag-AA52 Ag ppm	Au-AA27 Au ppm	S-IR08 S %	C-IR07 C %	Leco C organic %	Leco C inorganic %
11315M	738206	PUL-21	0.021	0.047	28.6	7.35	0.01	25	0.06	23.4	3.57	3.57	<0.02
11323M	738207	PUL-21	0.01	0.133	0.66	34	0.15	12	0.04	38.5	3.3	3.1	0.2

# Corona 11315M

March 2014

GJMcA 3.3.14

+53µm Mask	Volume %
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## Average composition - all grains

Py	Po	Sp	Gn	As	Cp	Te	Ga	n
3.3	0.0	37.1	0.0	0.0	0.1	0.0	59.5	400
9	0	52	2	0	3	15	75	

## ASSAYS

	SG	Cu	Pb	Zn	Ag	As	Fe
Calc'd	3.34	0.05	0.0	28.4	73	0.0	5.3
Actual							

## COMPOSITE PROPORTIONS

	Py	Po	Sp	Gn	Cp	Te	Ga	
Mono	0	0	50	0	0	0	29	
Binary	47	0	33	0	58	100	41	
Ternary	53	0	17	100	38	0	31	
Quat.y+	0	0	1	0	4	0	0	
#Grains	37.8	0.0	71.0	0.3	2.3	0.3	79.8	1.91

## BINARY ASSOCIATION MATRIX

	Py	Po	Sp	Gn	Cp	Te	Ga
Py		0	21	0	0	0	79
Po	0		0	0	0	0	0
Sp	4	0		0	6	2	89
Gn	0	0	0		0	0	0
Cp	0	0	100	0		0	0
Te	0	0	100	0	0		0
Ga	44	0	56	0	0	0	

## TOTAL ASSOCIATION MATRIX

	Py	Po	Sp	Gn	Cp	Te	Ga
Py		0	63	0	0	0	90
Po	0		0	0	0	0	0
Sp	15	0		1	5	1	46
Gn	0	0	100		0	0	100
Cp	4	0	100	0		0	42
Te	0	0	100	0	0		0
Ga	48	0	53	0	0	0	

of all

## DISTRIBUTION MATRIX

	Free	Binary						Tern	Quat	
		Py	Po	Sp	Gn	Cp	Te			Ga
Py	0		0	10	0	0	0	37	53	0
Po	0	0		0	0	0	0	0	0	0
Sp	50	1	0		0	2	1	29	17	1
Gn	0	0	0	0		0	0	0	100	0
Cp	0	0	0	58	0		0	0	38	4
Te	0	0	0	100	0	0		0	0	0
Ga	29	18	0	23	0	0	0		31	0

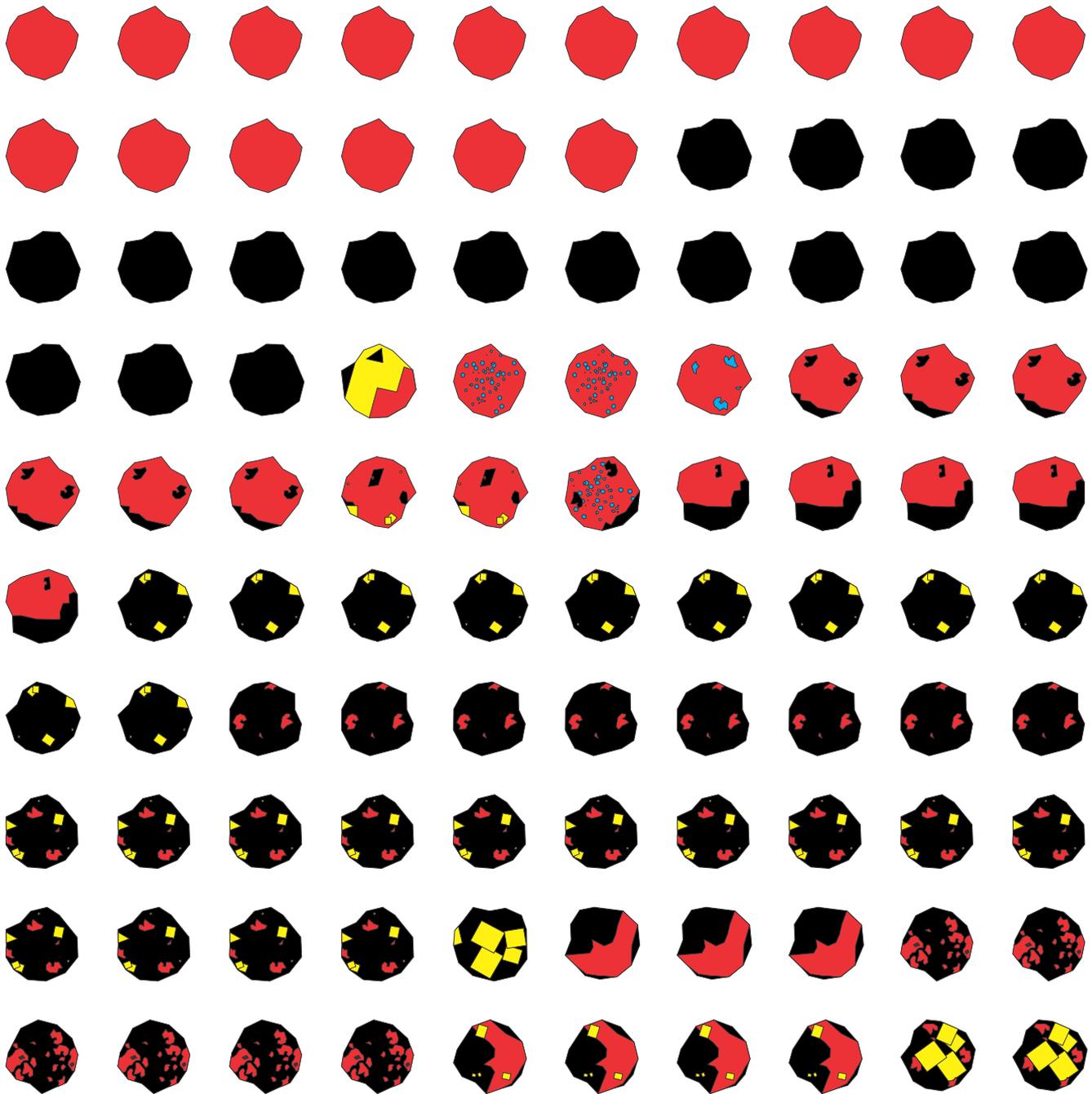
# Corona Minerals - Drillcore Mineralogy

11315M

+53 $\mu$ m Mask

March

2014



Pyrite



Sphalerite



Galena



Chalcopyrite



Tetrahedrite



Carbonaceous  
Matter



Gangue

Sample Scan DDH CZD003 5.75m



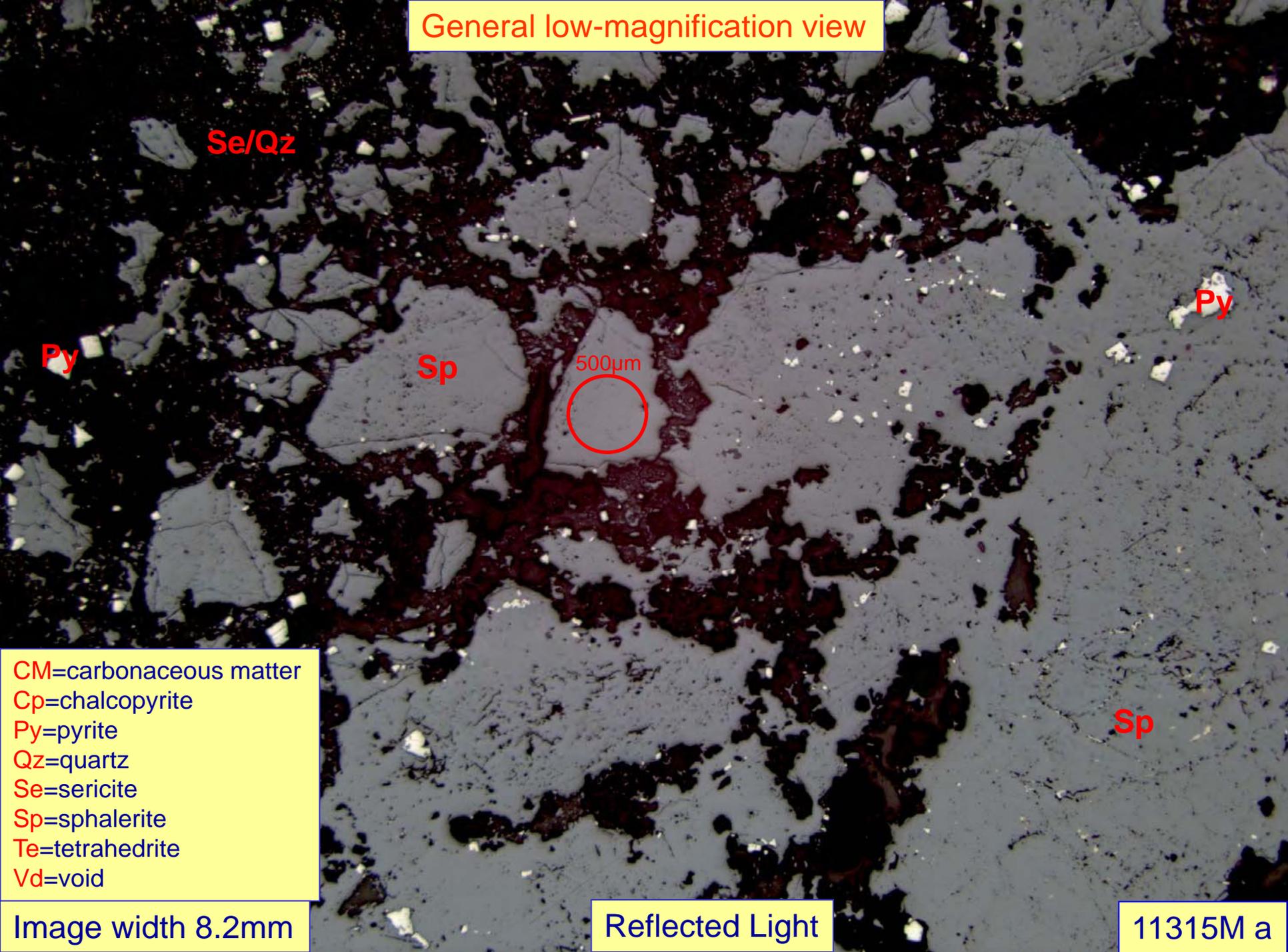
**Offcut Assay**

??%Cu, ??%Fe, 0.??ppm Au

Image width 45mm

11315M

General low-magnification view



Se/Qz

Py

Sp

500µm

Py

Sp

- CM=carbonaceous matter
- Cp=chalcopyrite
- Py=pyrite
- Qz=quartz
- Se=sericite
- Sp=sphalerite
- Te=tetrahedrite
- Vd=void

Image width 8.2mm

Reflected Light

11315M a

Massive sphalerite

106µm



Py

Qz

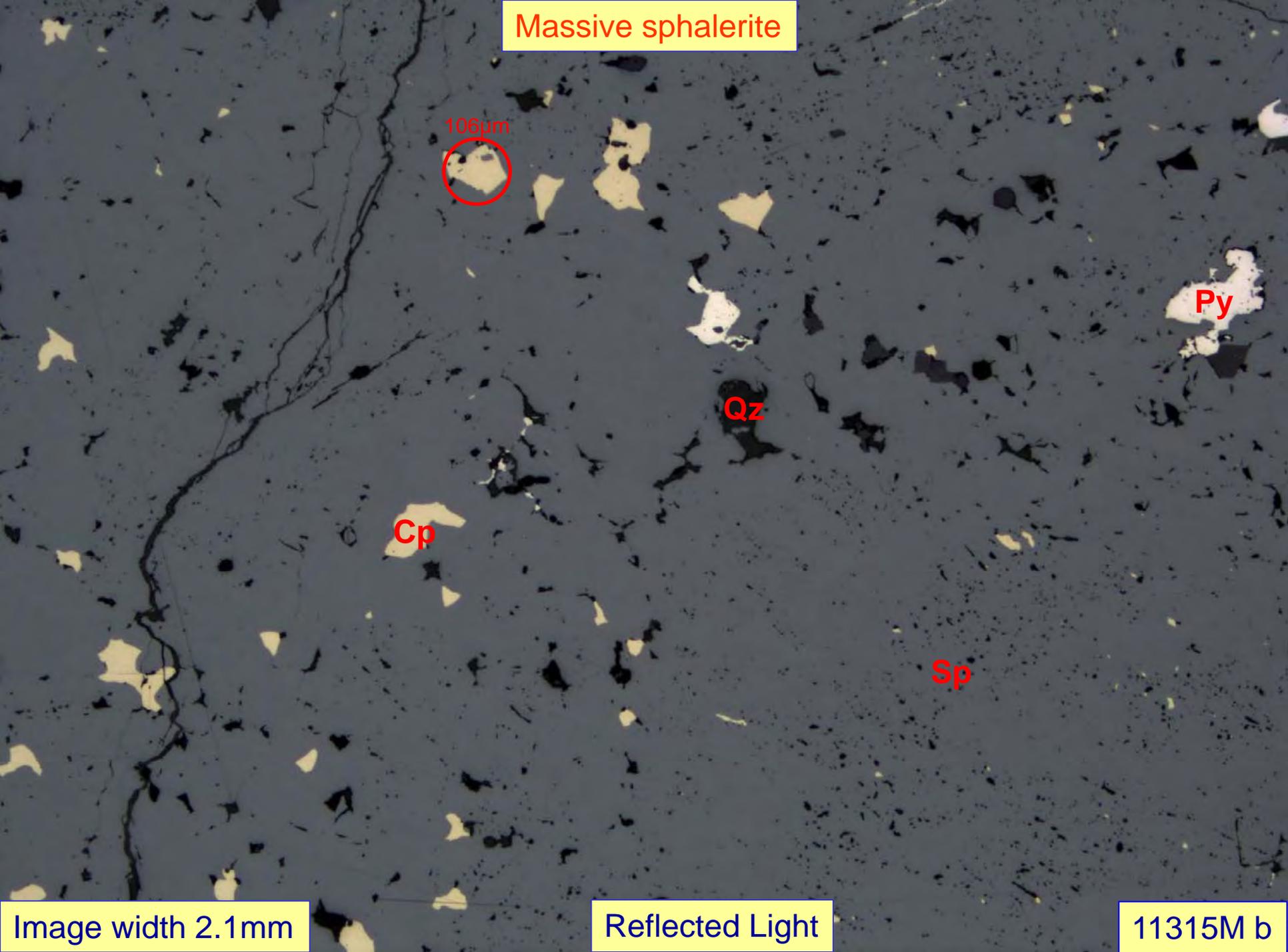
Cp

Sp

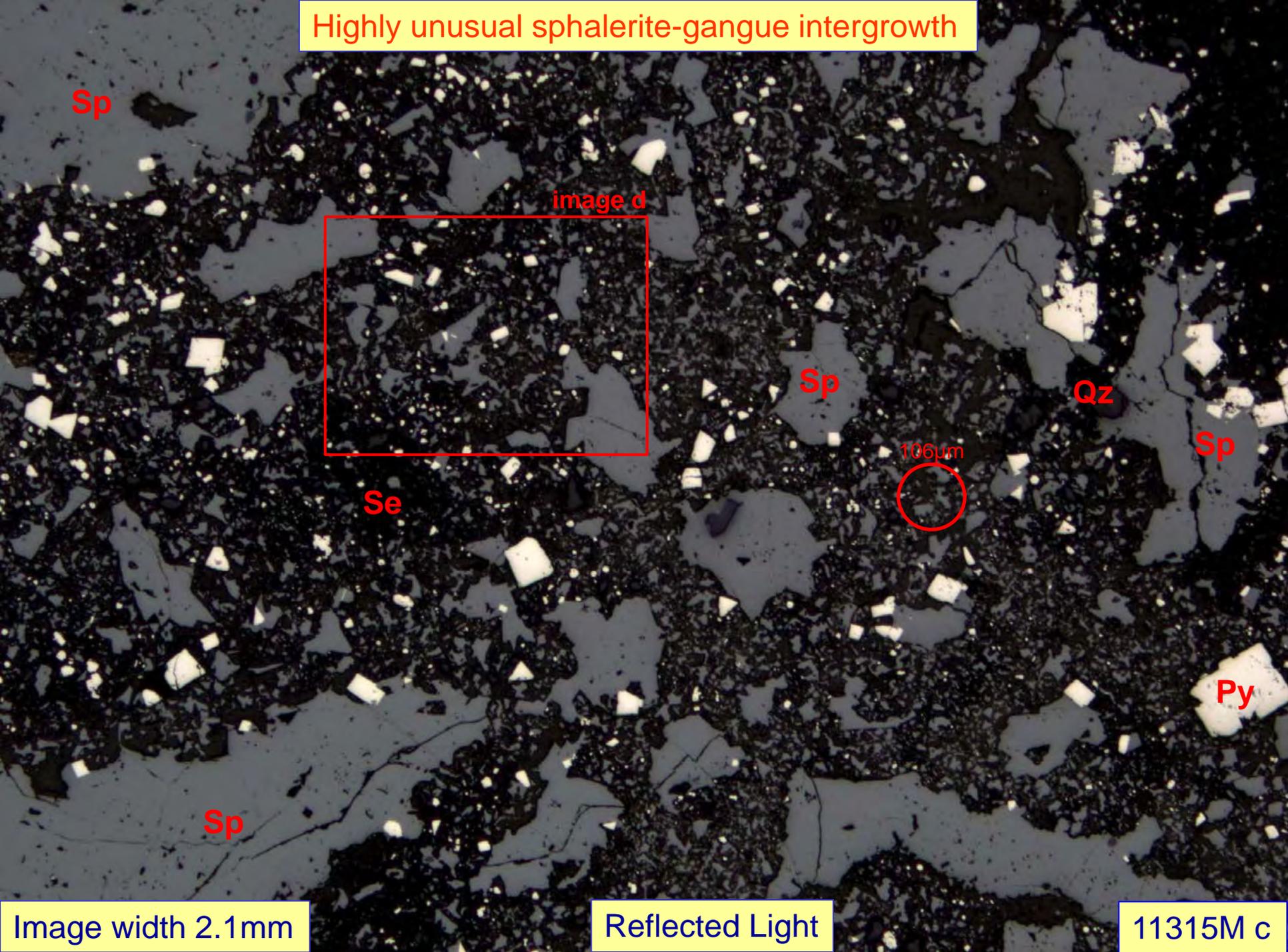
Image width 2.1mm

Reflected Light

11315M b



Highly unusual sphalerite-gangue intergrowth



Sp

image d

Se

Sp

Qz

Sp

106µm

Py

Sp

Image width 2.1mm

Reflected Light

11315M c

Detail from previous image

Sp

Py

Sp

27µm

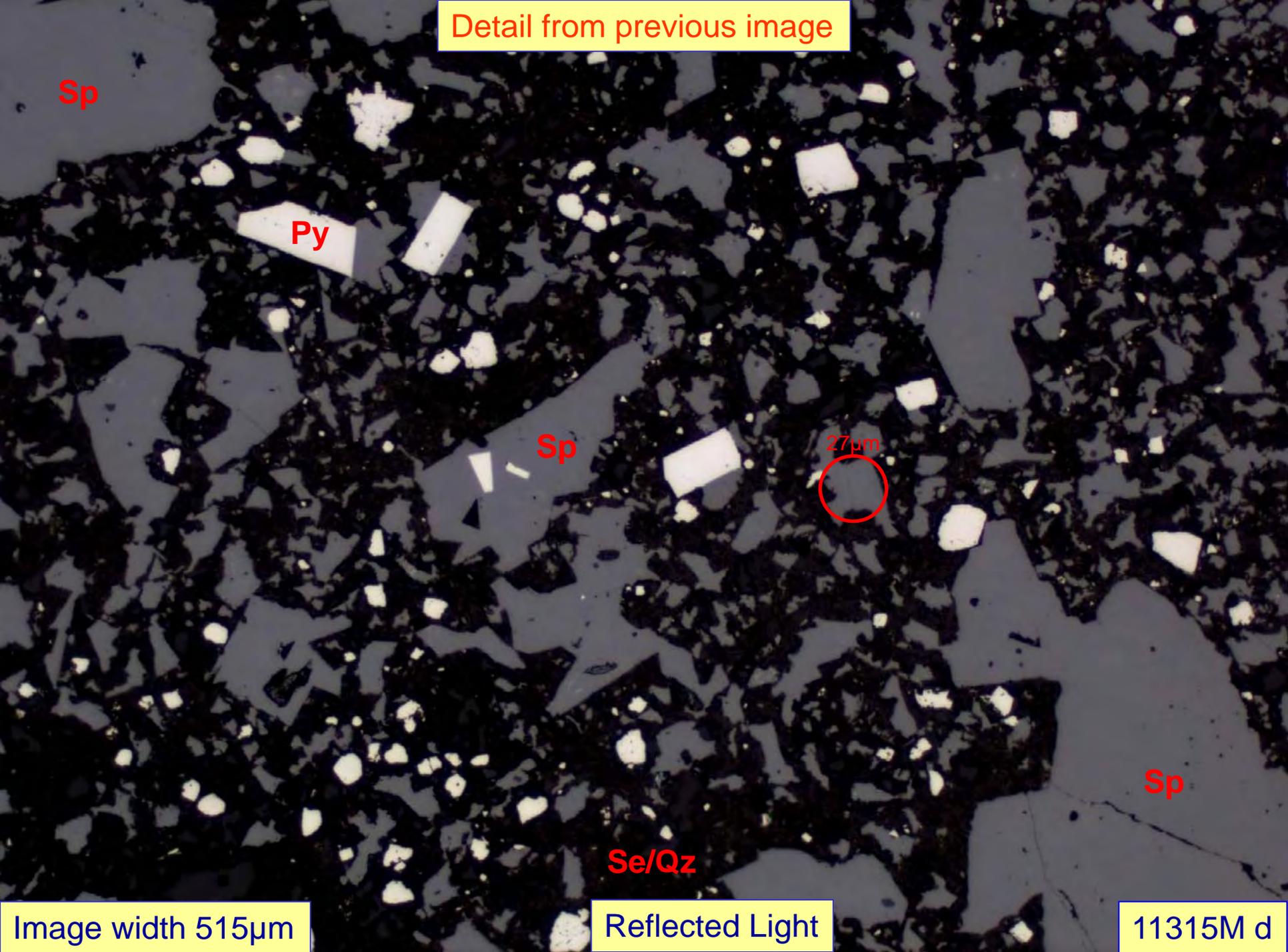
Sp

Se/Qz

Image width 515µm

Reflected Light

11315M d



Fine-grained pyrite layers

Sp

Se

Py

image f

106µm

Py

Se/Py

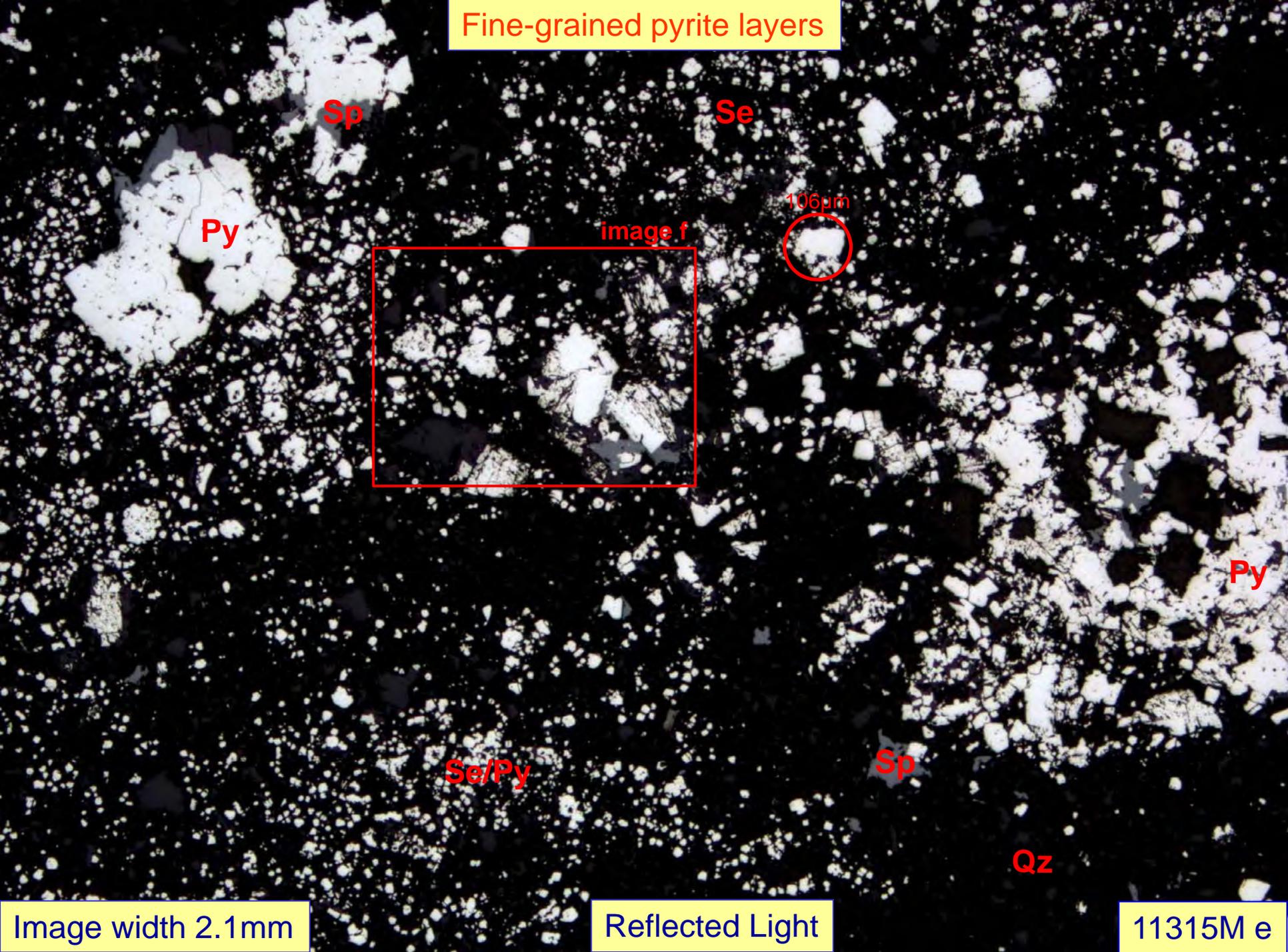
Sp

Qz

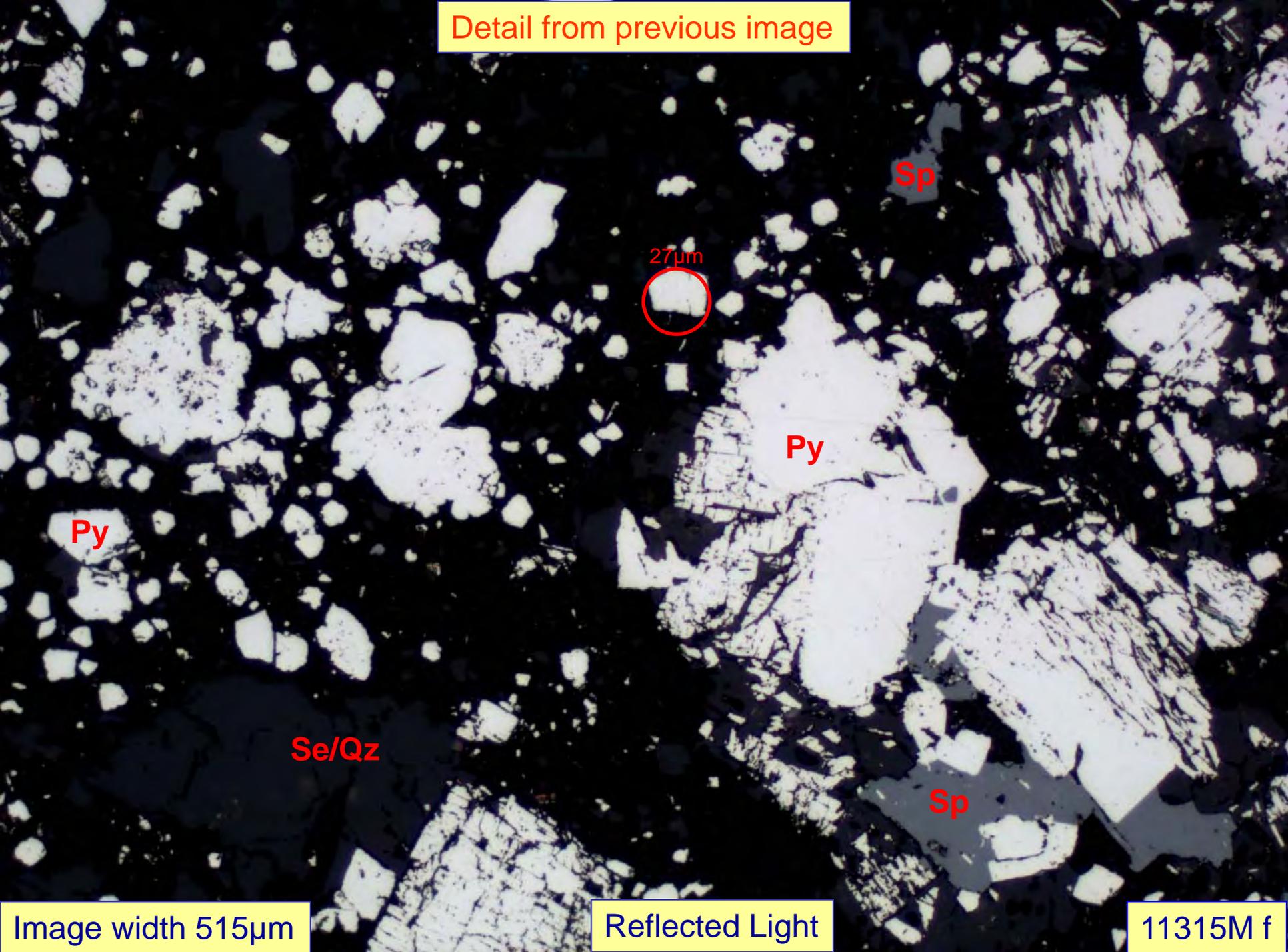
Image width 2.1mm

Reflected Light

11315M e



Detail from previous image



27µm

Py

Sp

Py

Se/Qz

Sp

Image width 515µm

Reflected Light

11315M f

Coarse sphalerite in disrupted quartz veinlet

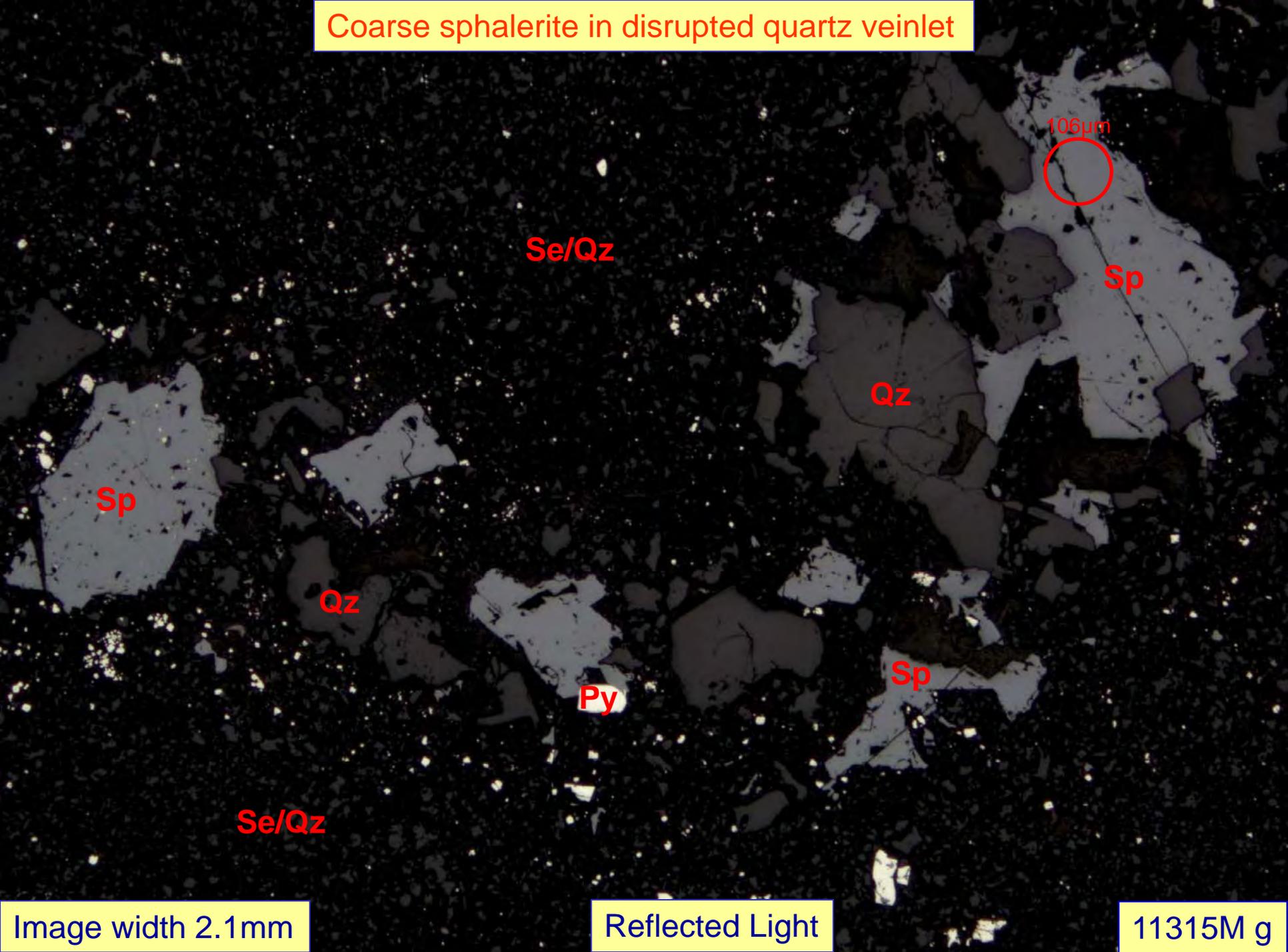


Image width 2.1mm

Reflected Light

11315M g

Shattered massive sphalerite

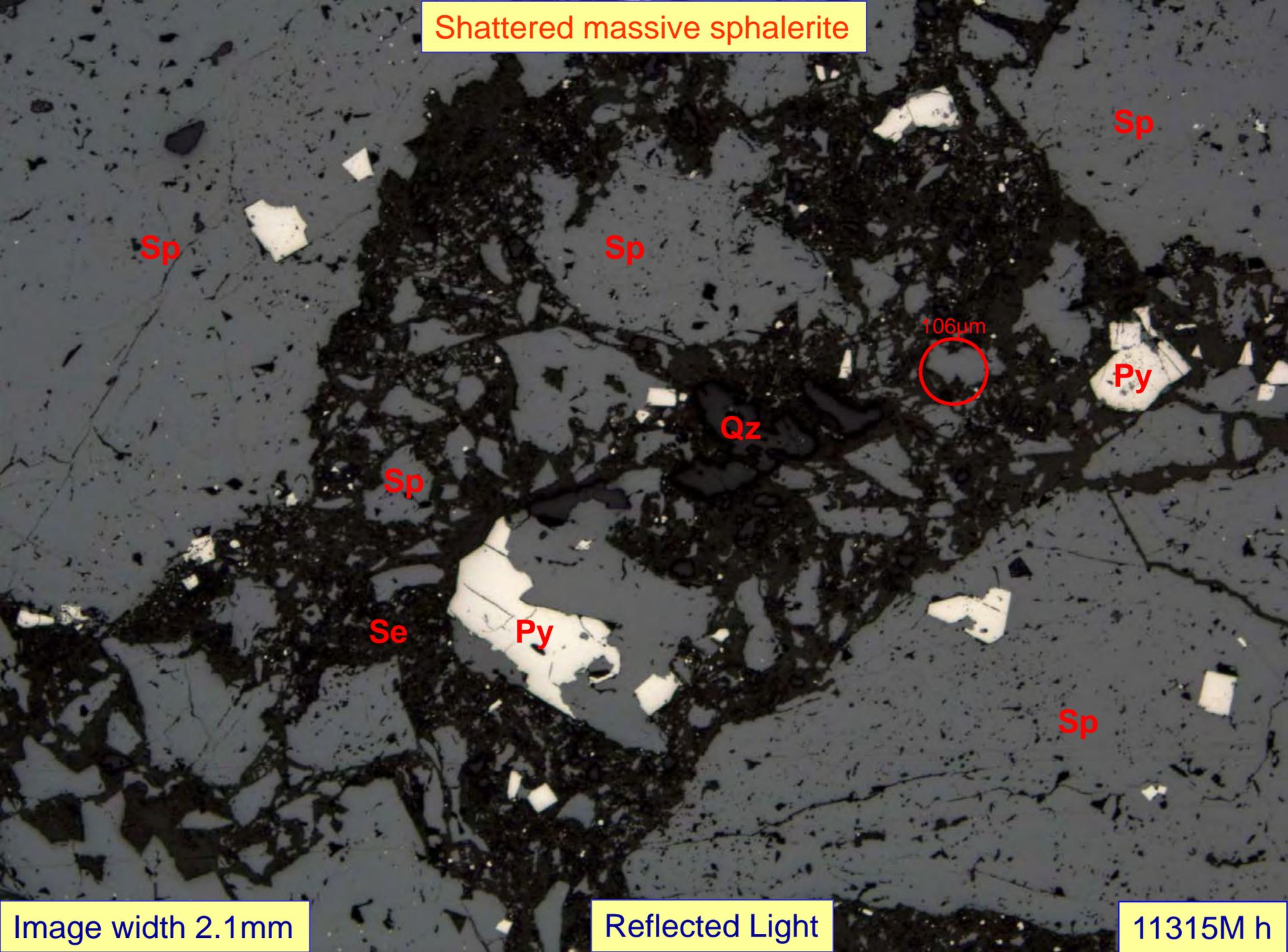


Image width 2.1mm

Reflected Light

11315M h

Chalcopyrite blebs in massive sphalerite

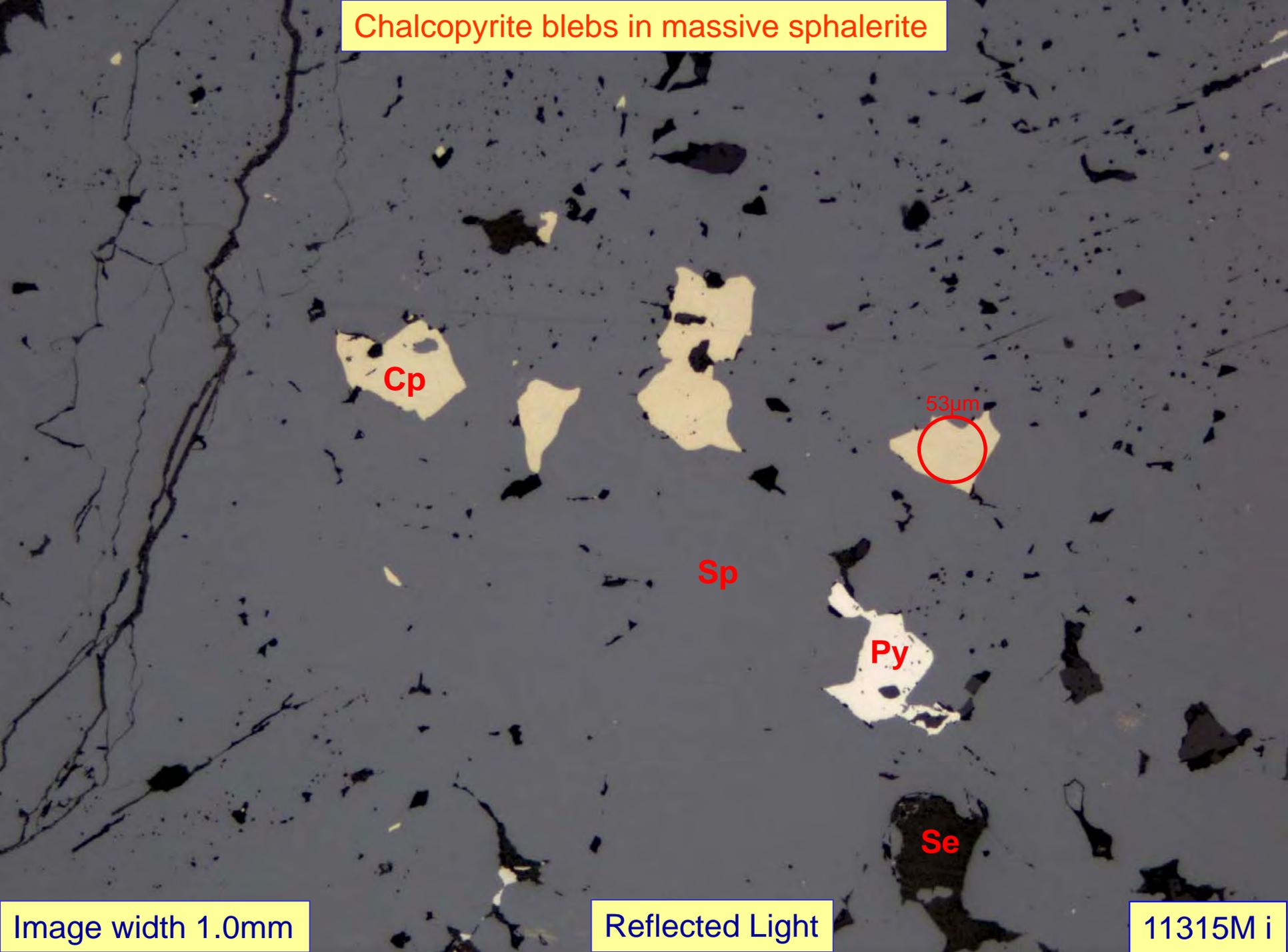


Image width 1.0mm

Reflected Light

11315M i

Rare tetrahedrite hosted by massive sphalerite

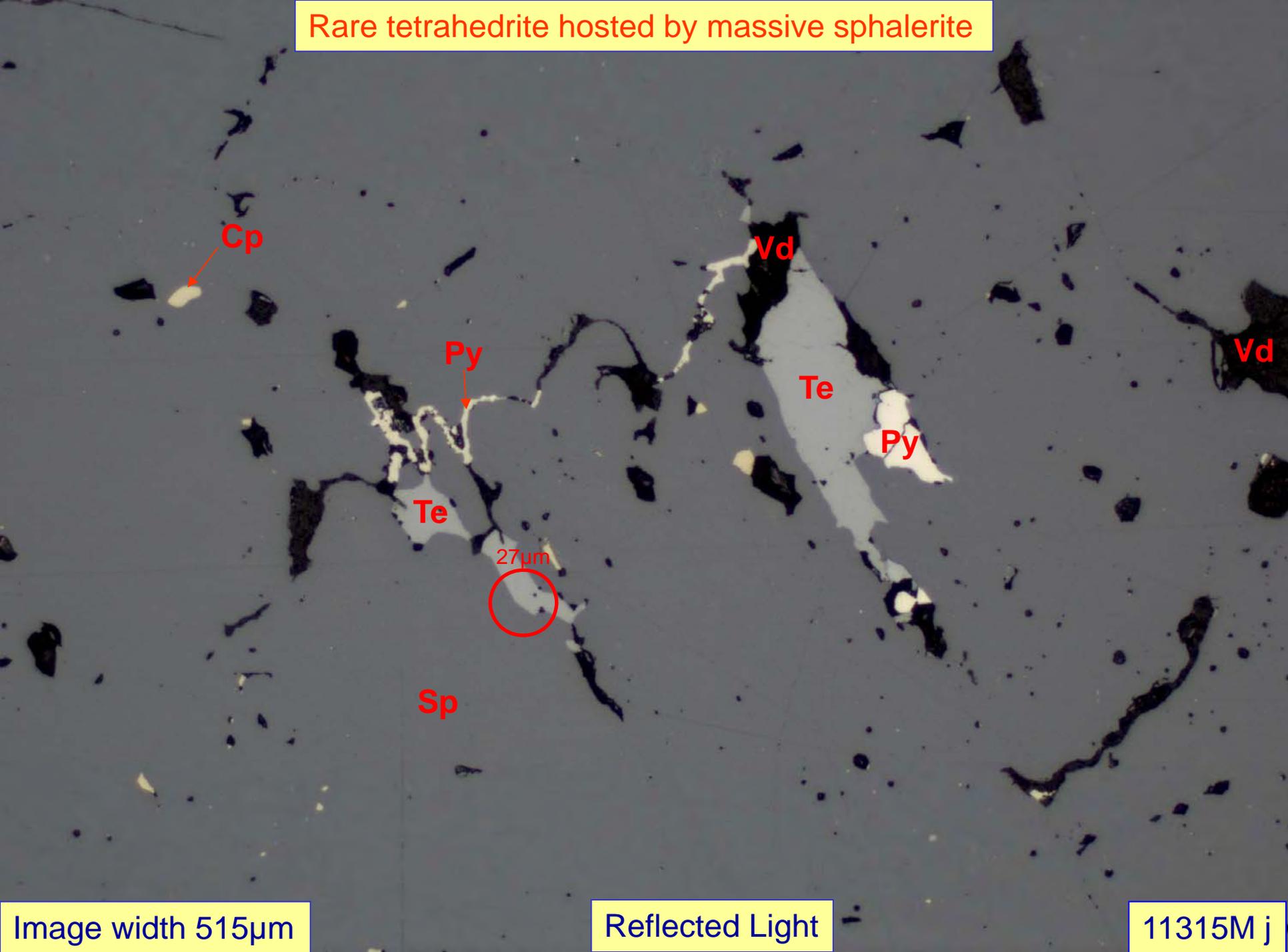
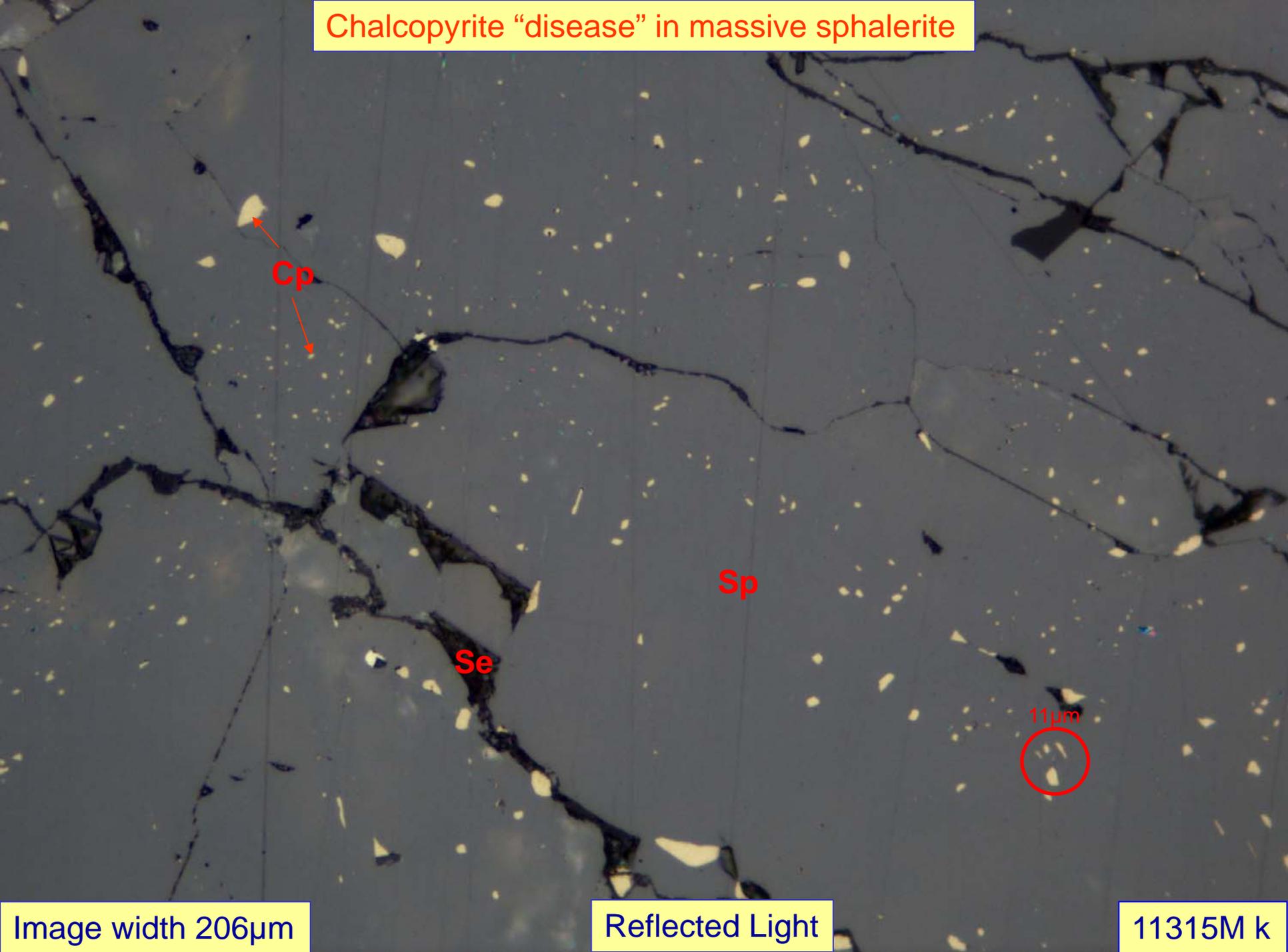


Image width 515µm

Reflected Light

11315M j

Chalcopyrite "disease" in massive sphalerite



Cp

Sp

Se

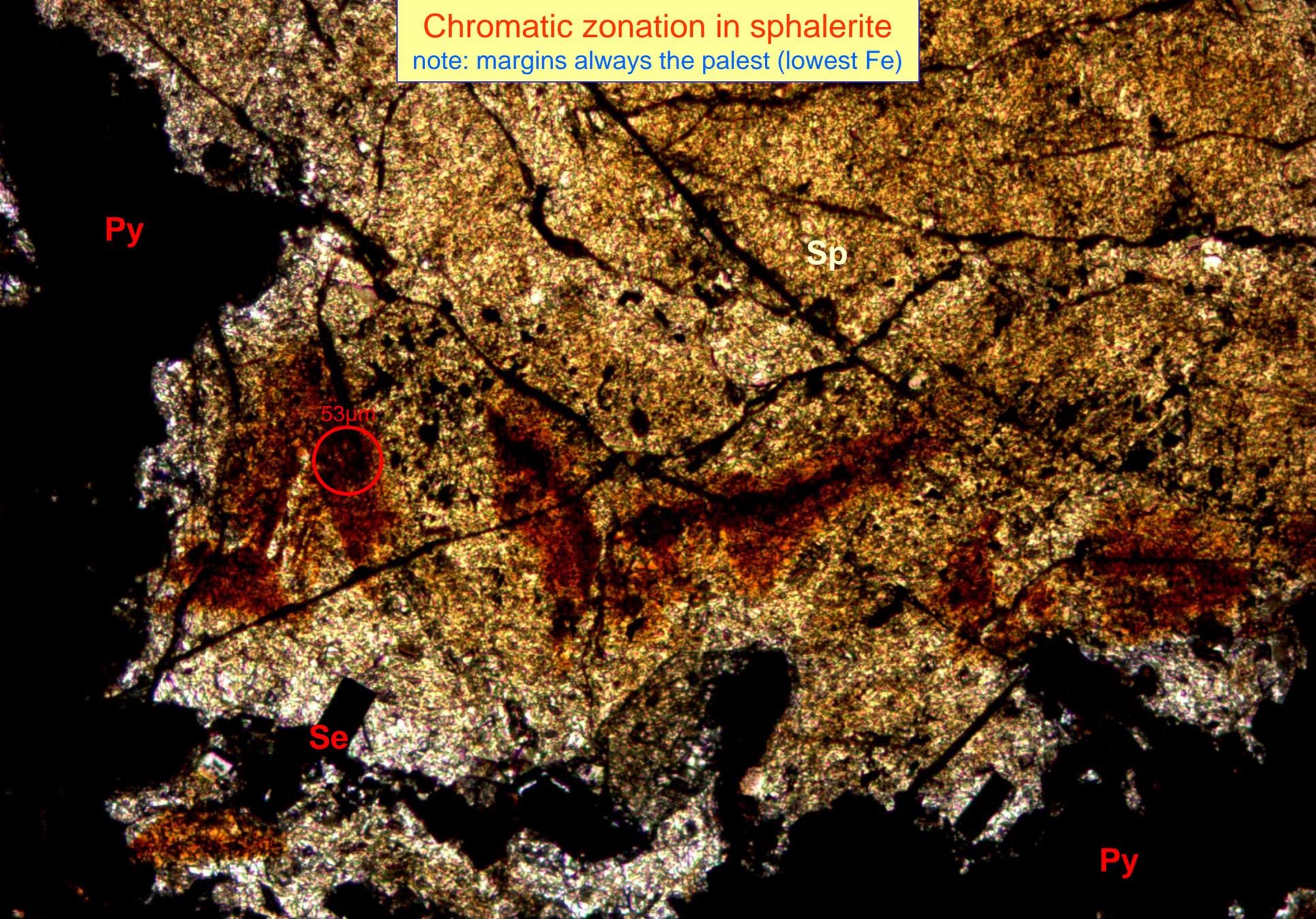
11µm

Image width 206µm

Reflected Light

11315M k

Chromatic zonation in sphalerite  
note: margins always the palest (lowest Fe)



Py

Sp

53µm

Se

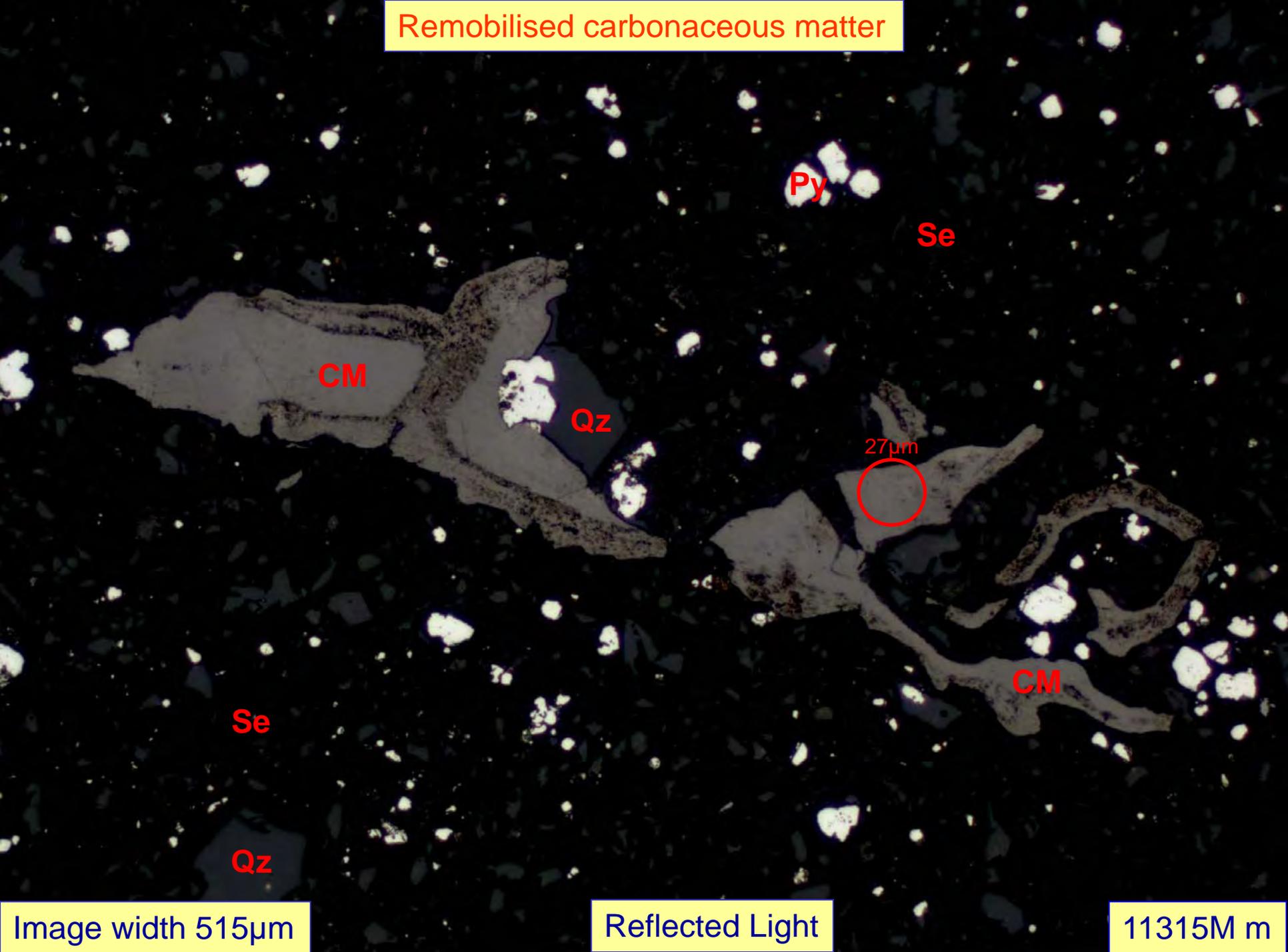
Py

Image width 1.0mm

Transmitted Light – uncrossed nicols

11315M I

Remobilised carbonaceous matter



CM

Qz

Py

Se

27µm

CM

Se

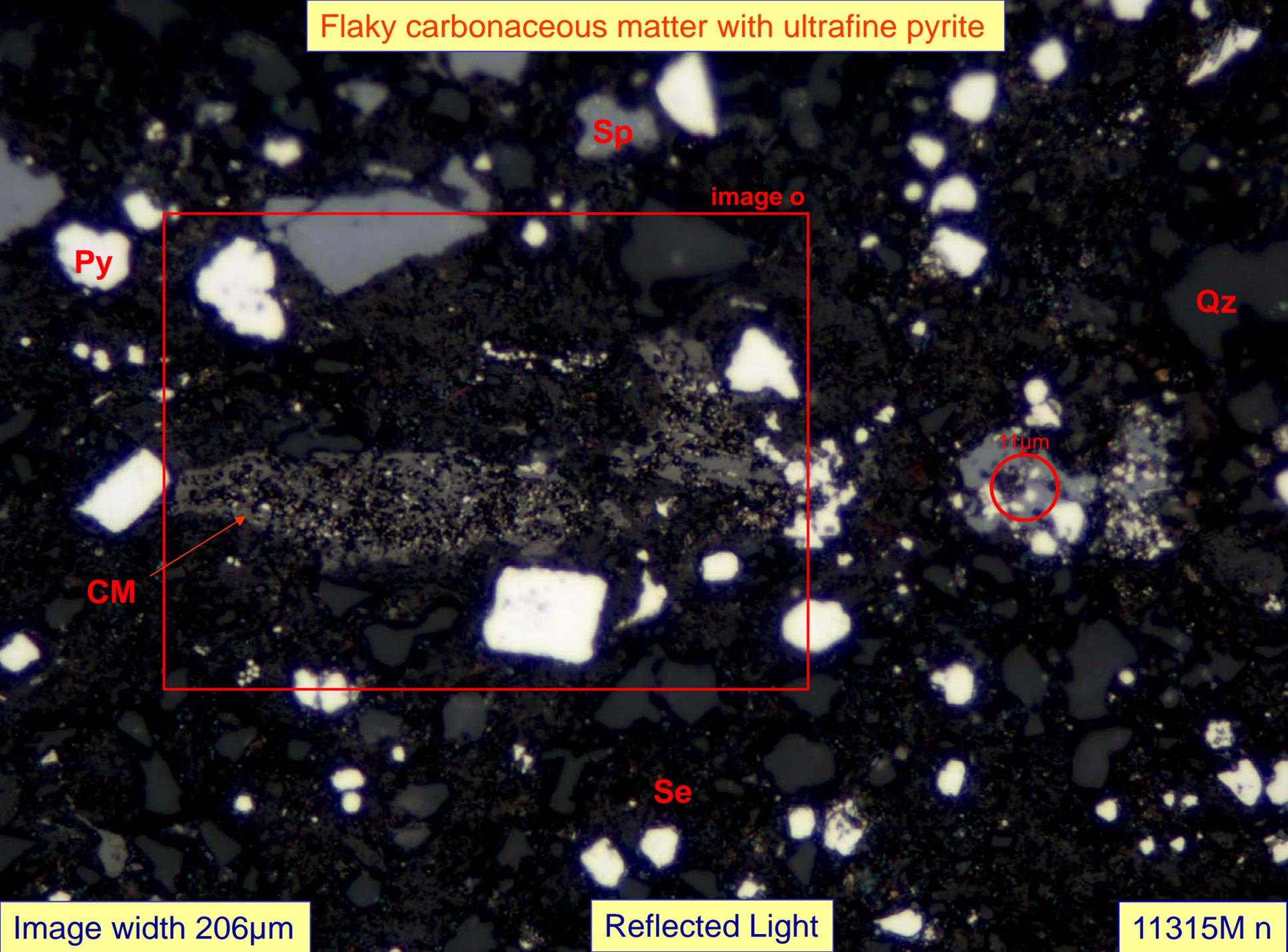
Qz

Image width 515µm

Reflected Light

11315M m

Flaky carbonaceous matter with ultrafine pyrite



Py

Sp

image o

Qz

11um

CM

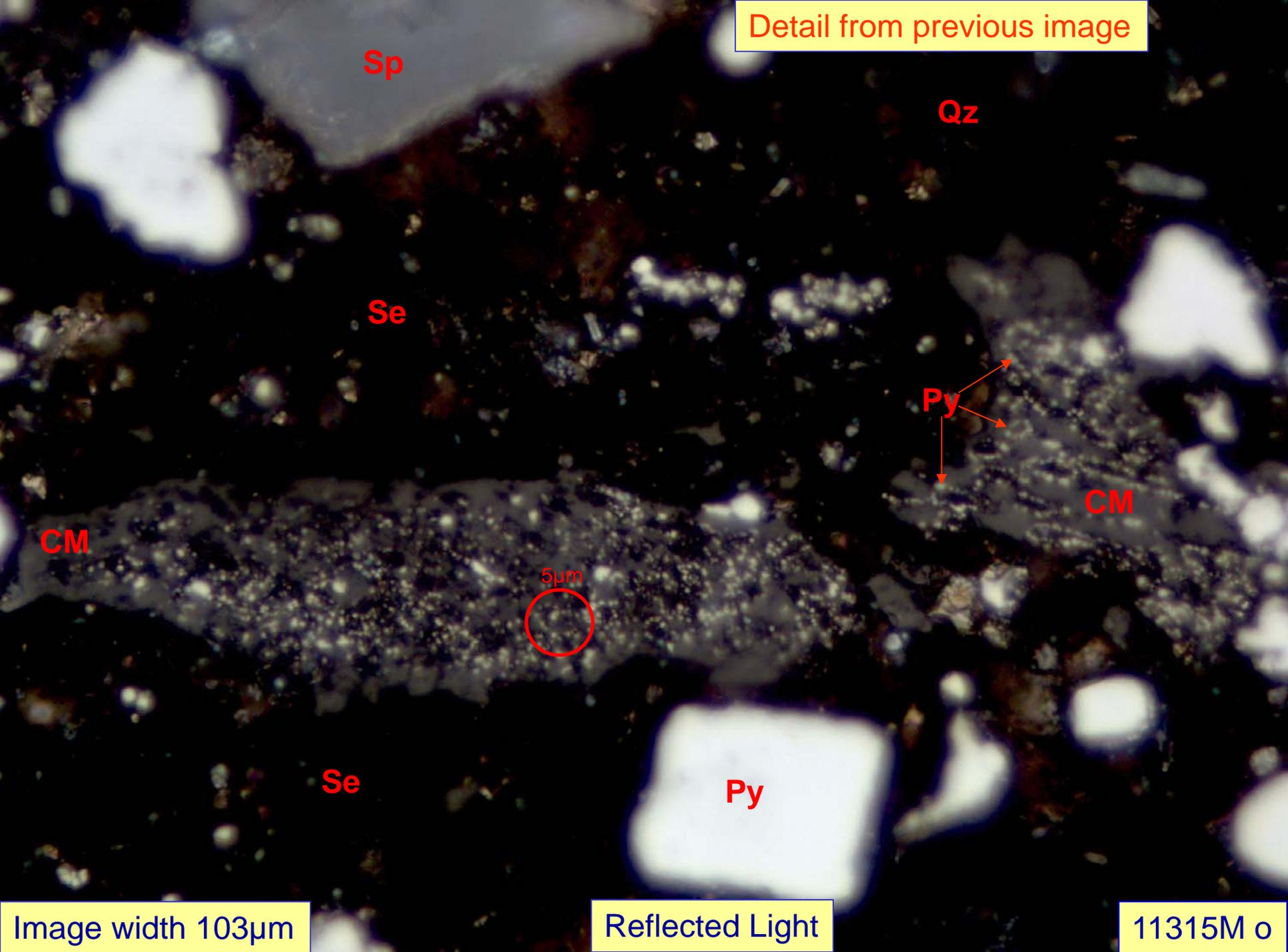
Se

Image width 206µm

Reflected Light

11315M n

Detail from previous image



Sp

Qz

Se

Py

CM

CM

5µm

Se

Py

Image width 103µm

Reflected Light

11315M o

# Corona 11323M

March 2014

GJMcA 4.3.14

+53µm Mask	Volume %
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## Average composition - all grains

Py	Po	Sp	Gn	As	Cp	Te	Ga	n
38.9	0.0	1.1	0.0	0.0	0.0	0.0	60.0	400
46	0	7	4	0	0	0	68	

## ASSAYS

	SG	Cu	Pb	Zn	Ag	As	Fe
Calc'd	3.66	0.00	0.1	0.8	33	0.1	25.7
Actual							

## COMPOSITE PROPORTIONS

	Py	Po	Sp	Gn	Cp	Te	Ga	
Mono	25	0	0	0	0	0	24	
Binary	60	0	29	0	0	0	65	
Ternary	15	0	71	100	0	0	10	
Quat.y+	0	0	0	0	0	0	0	
#Grains	85.0	0.0	14.8	1.3	0.0	0.0	87.8	1.89

## BINARY ASSOCIATION MATRIX

	Py	Po	Sp	Gn	Cp	Te	Ga
Py		0	7	0	0	0	93
Po	0		0	0	0	0	0
Sp	65	0		0	0	0	35
Gn	0	0	0		0	0	0
Cp	0	0	0	0		0	0
Te	0	0	0	0	0		0
Ga	99	0	1	0	0	0	

## TOTAL ASSOCIATION MATRIX

	Py	Po	Sp	Gn	Cp	Te	Ga
Py		0	18	3	0	0	69
Po	0		0	0	0	0	0
Sp	90	0		2	0	0	79
Gn	100	0	63		0	0	37
Cp	0	0	0	0		0	0
Te	0	0	0	0	0		0
Ga	75	0	11	0	0	0	

of all

## DISTRIBUTION MATRIX

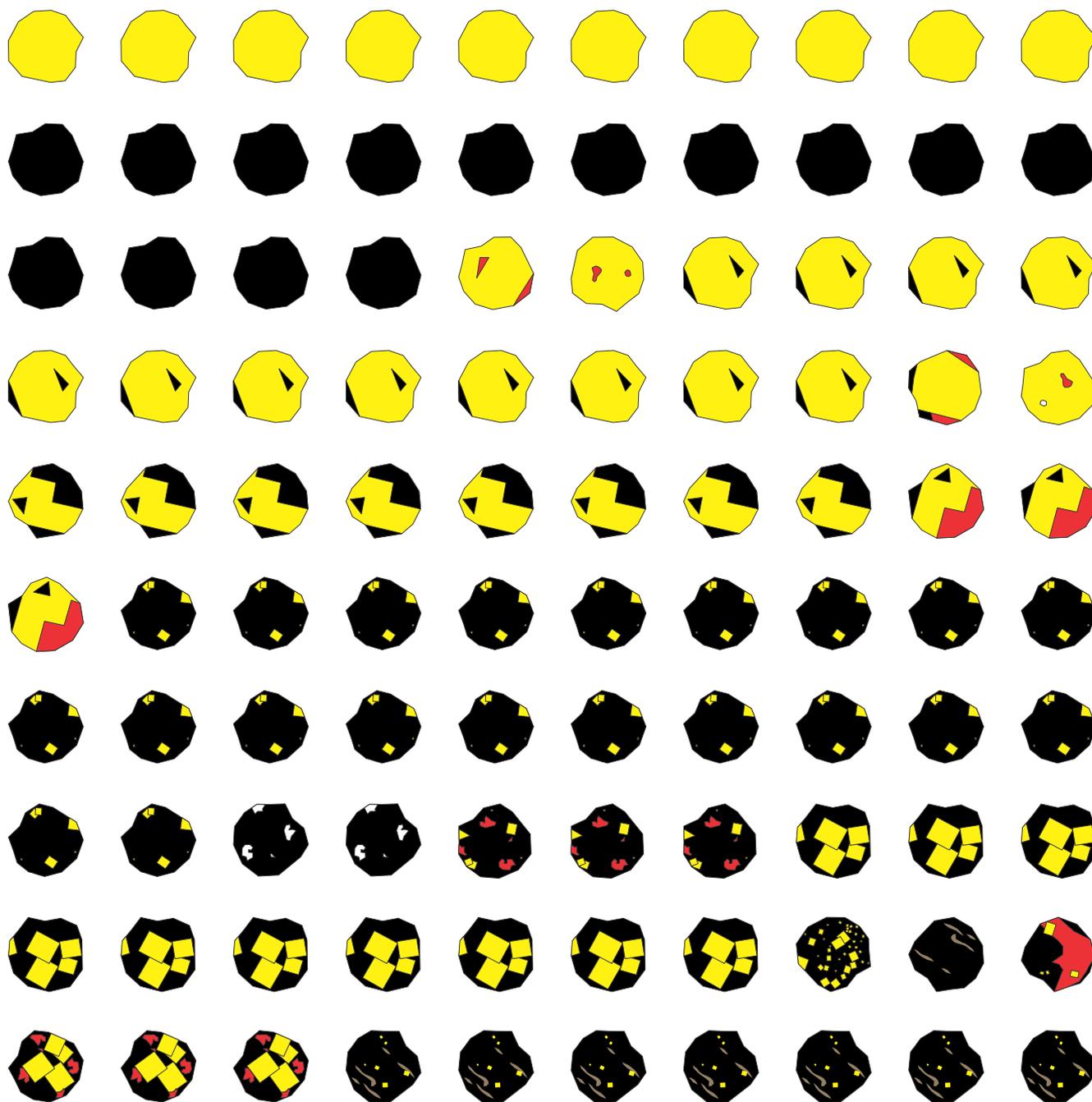
	Free	Binary						Tern	Quat	
		Py	Po	Sp	Gn	Cp	Te			Ga
Py	25		0	4	0	0	0	56	15	0
Po	0	0		0	0	0	0	0	0	0
Sp	0	19	0		0	0	0	10	71	0
Gn	0	0	0	0		0	0	0	100	0
Cp	0	0	0	0	0		0	0	0	0
Te	0	0	0	0	0	0		0	0	0
Ga	24	65	0	1	0	0	0		10	0

# Corona Minerals - Drillcore Mineralogy

11323M

+53 $\mu$ m Mask

March 2014



Pyrite



Sphalerite



Galena



Chalcopyrite



Tetrahedrite



Carbonaceous  
Matter



Gangue



**Offcut Assay**

??%Cu, ??%Fe, 0.??ppm Au

General low-magnification view

Py

Se

Py

Qz

500um



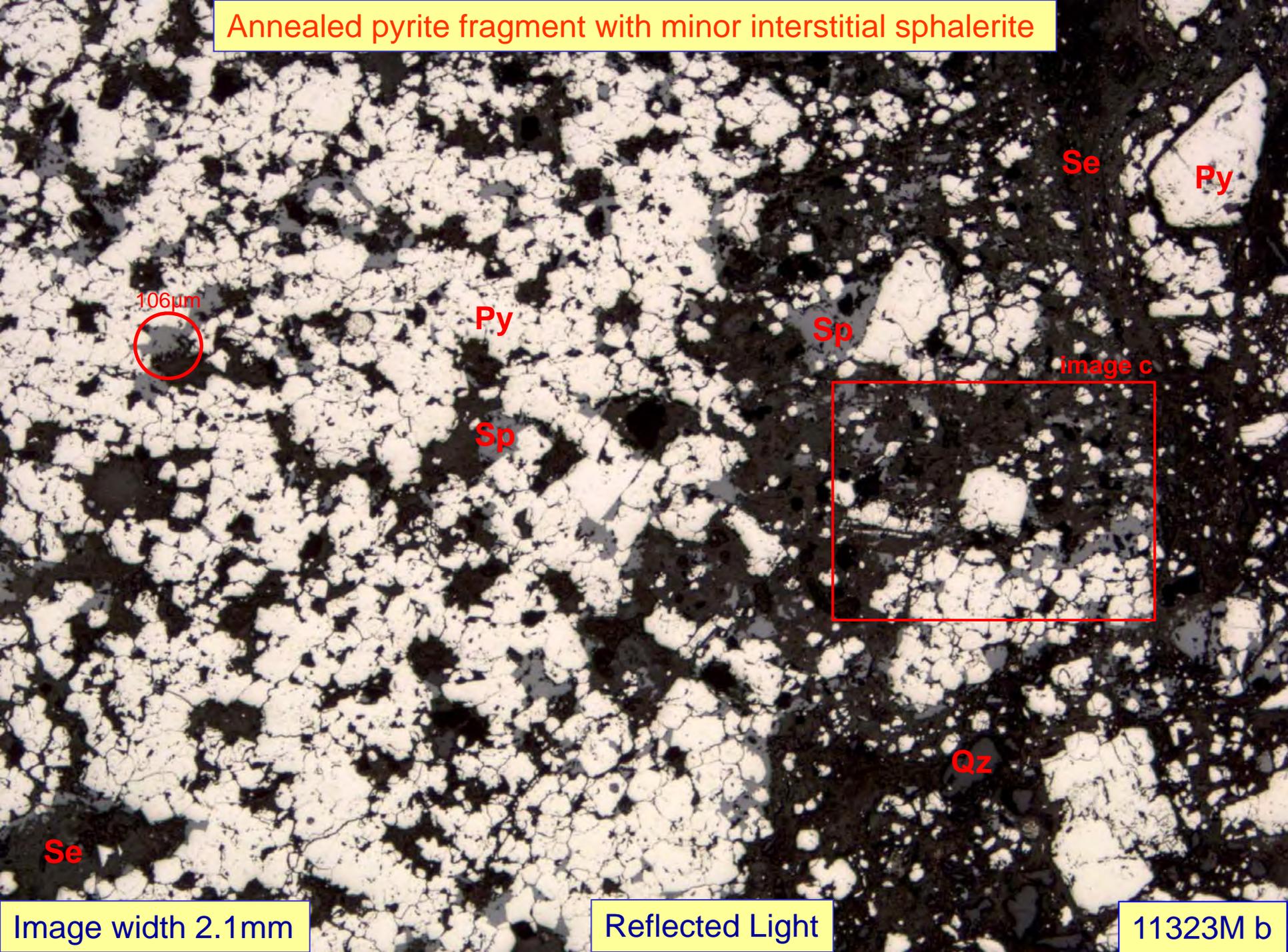
CM=carbonaceous matter  
Cy=clay  
Gn=galena  
Py=pyrite  
Qz=quartz  
Se=sericite  
Sp=sphalerite

Image width 8.2mm

Reflected Light

11323M a

Annealed pyrite fragment with minor interstitial sphalerite



Se

Py

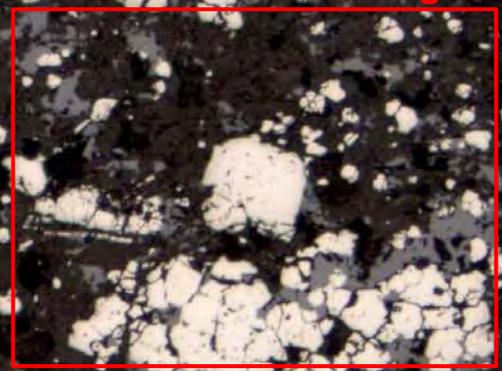
106µm



Py

Sp

image c



Sp

Qz

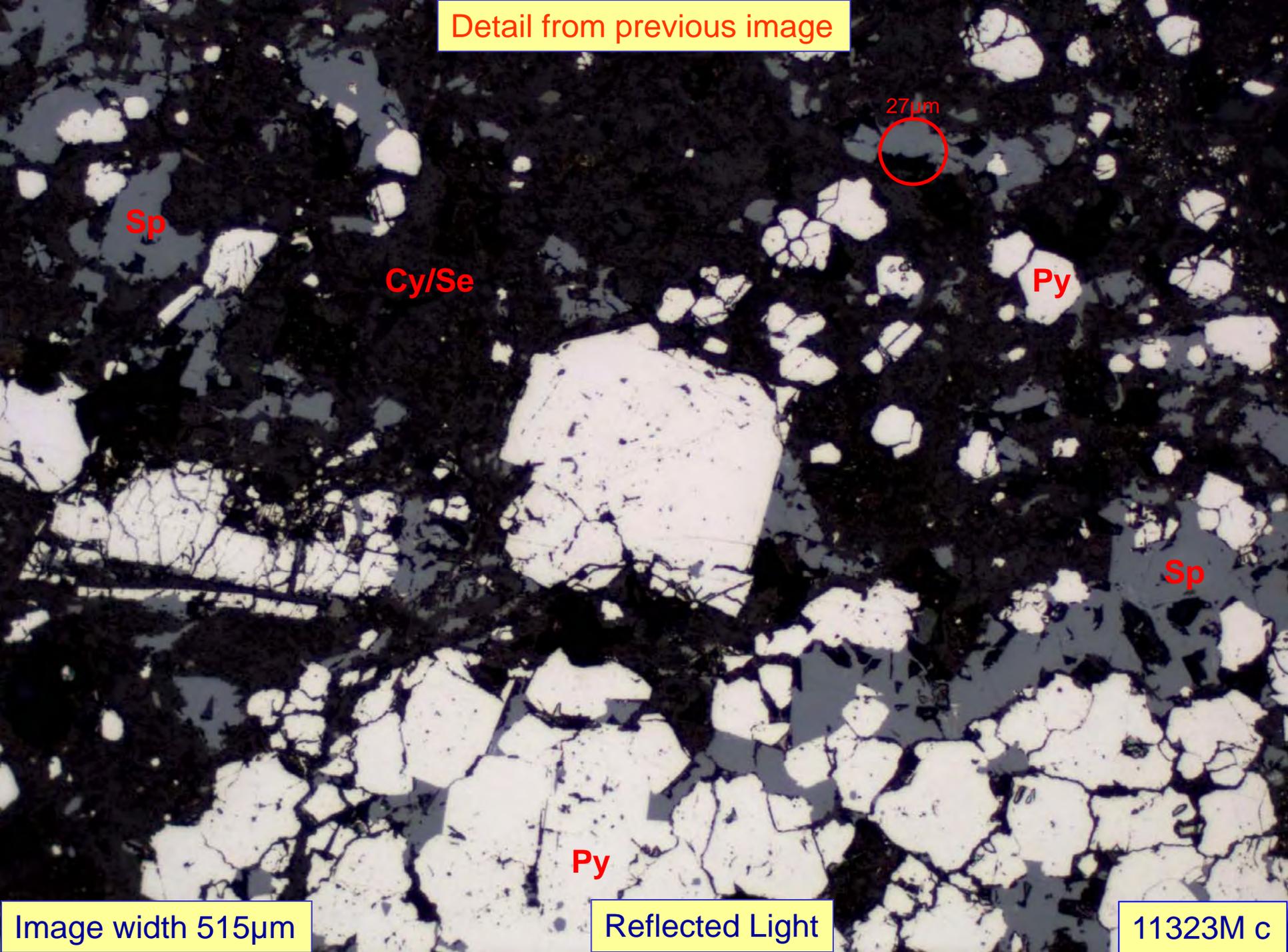
Se

Image width 2.1mm

Reflected Light

11323M b

Detail from previous image



Sp

Cy/Se

27µm

Py

Sp

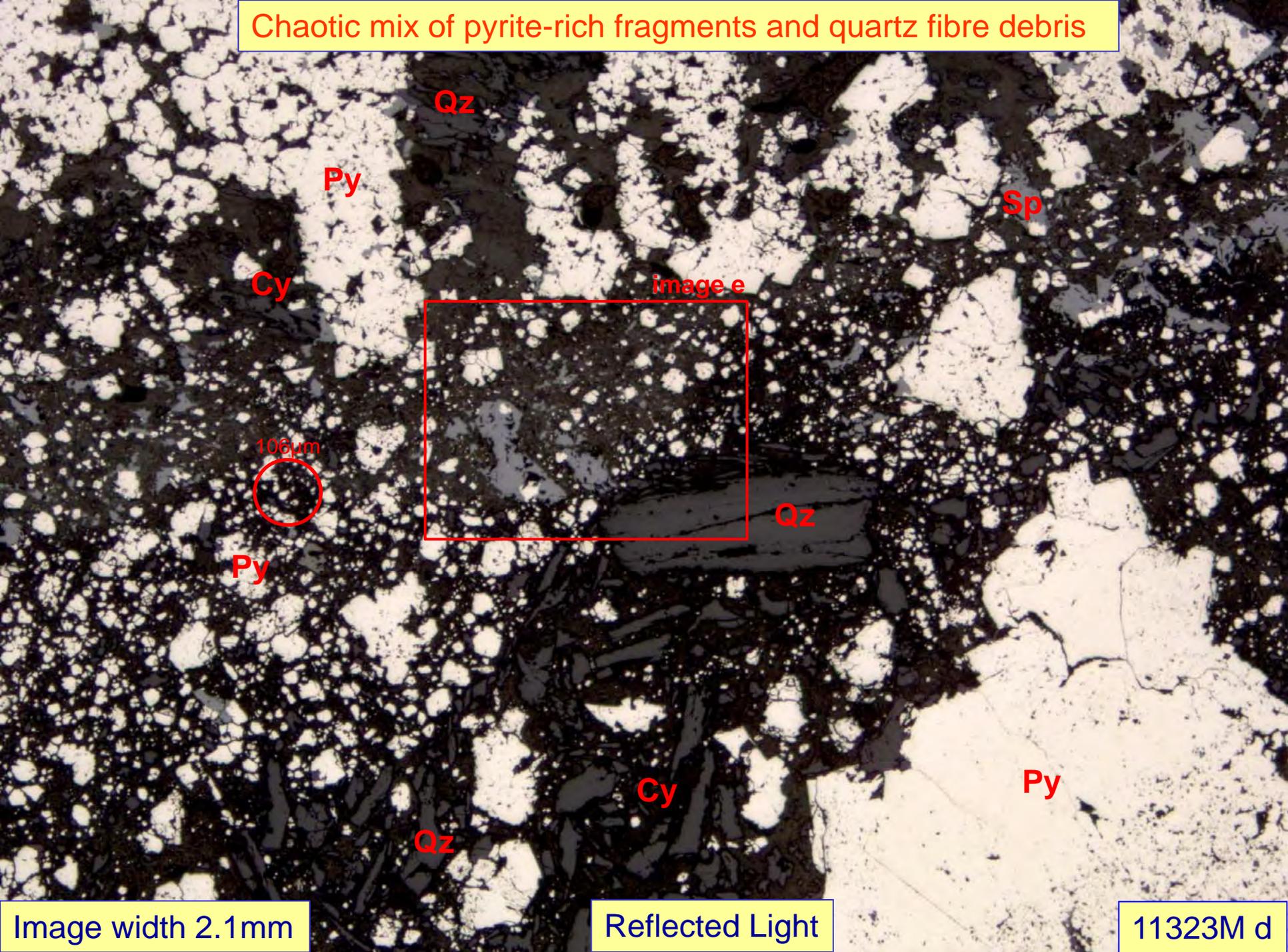
Py

Image width 515µm

Reflected Light

11323M c

Chaotic mix of pyrite-rich fragments and quartz fibre debris



Cy

Py

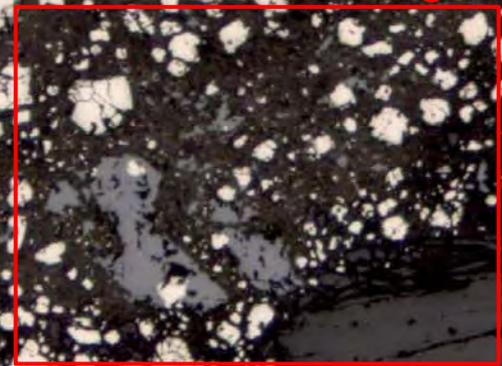
Qz

Sp

image e

106µm

Py



Qz

Cy

Py

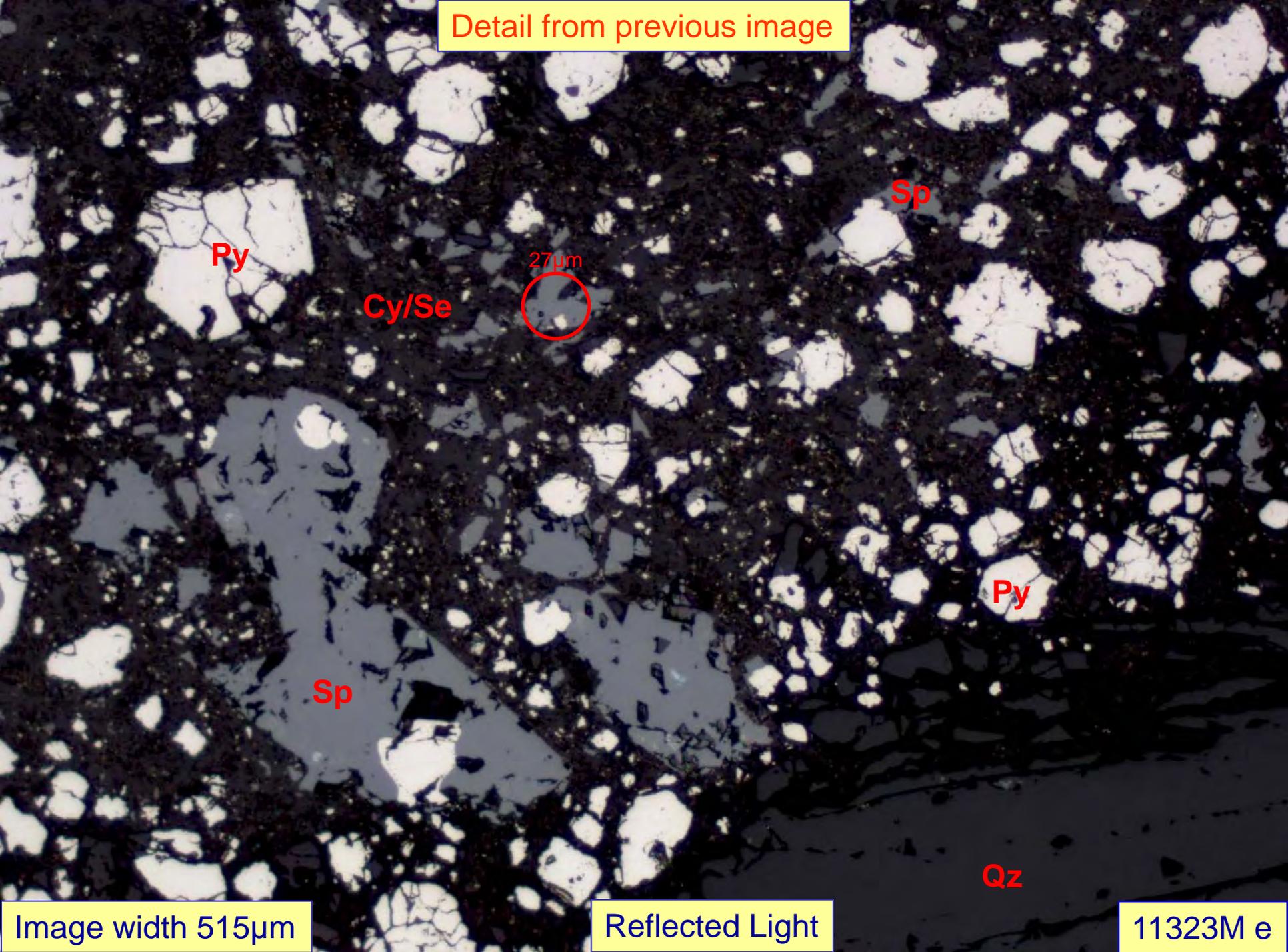
Qz

Image width 2.1mm

Reflected Light

11323M d

Detail from previous image



Py

Cy/Se

27µm

Sp

Py

Sp

Qz

Image width 515µm

Reflected Light

11323M e

Fine-grained mix of mineralised shale, pyrite and quartz fibres

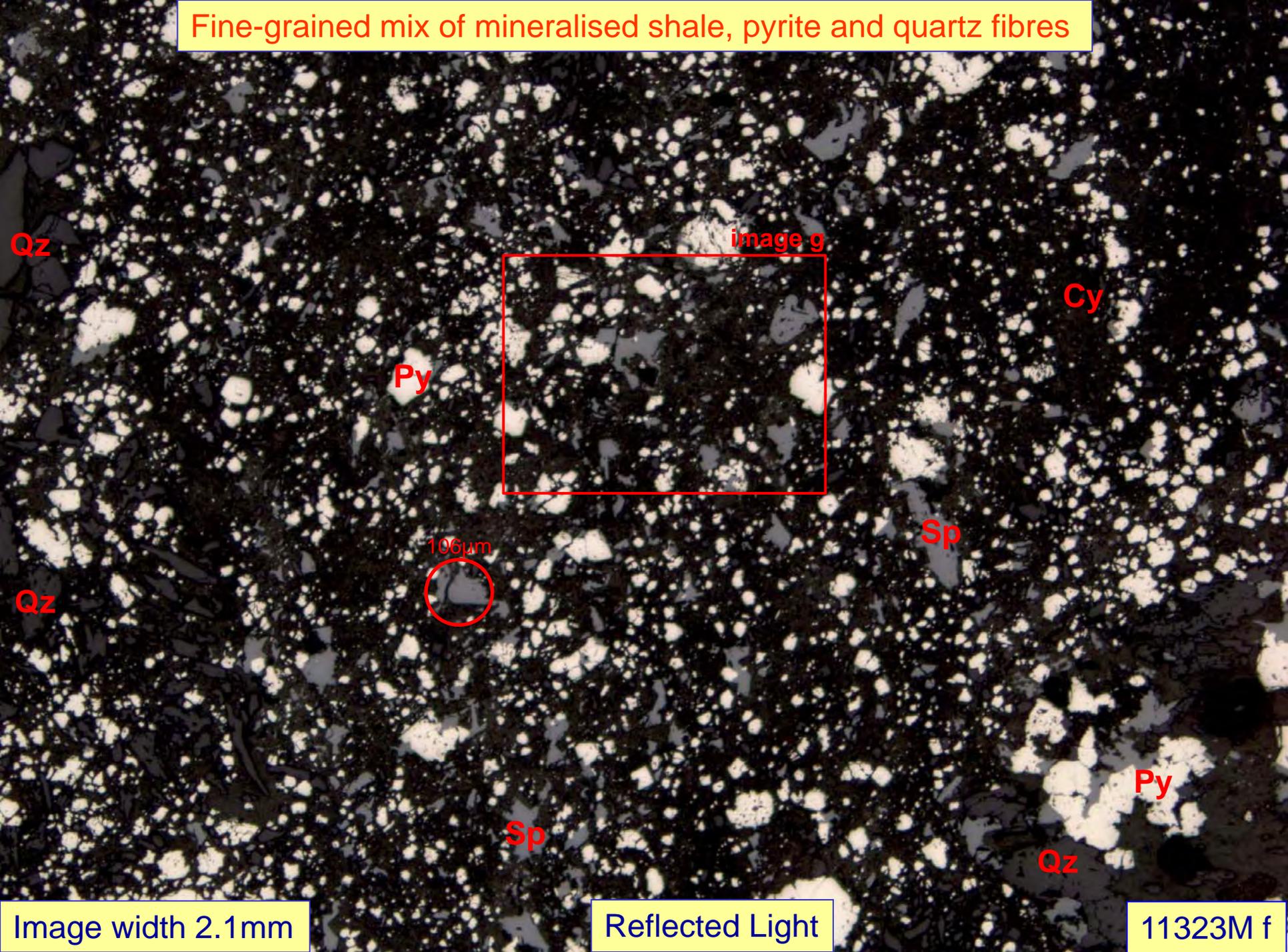
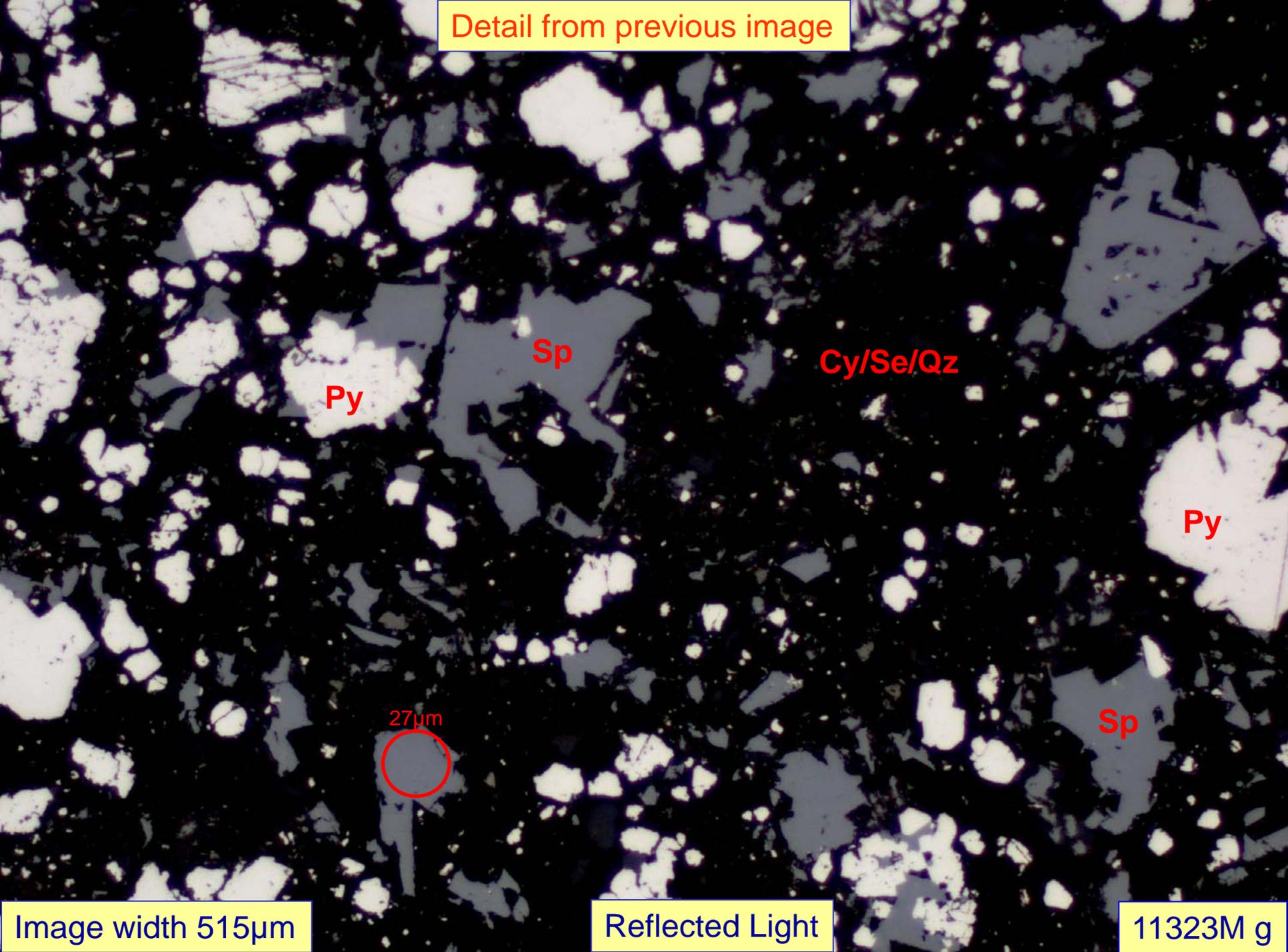


Image width 2.1mm

Reflected Light

11323M f

Detail from previous image



Py

Sp

Cy/Se/Qz

Py

Sp

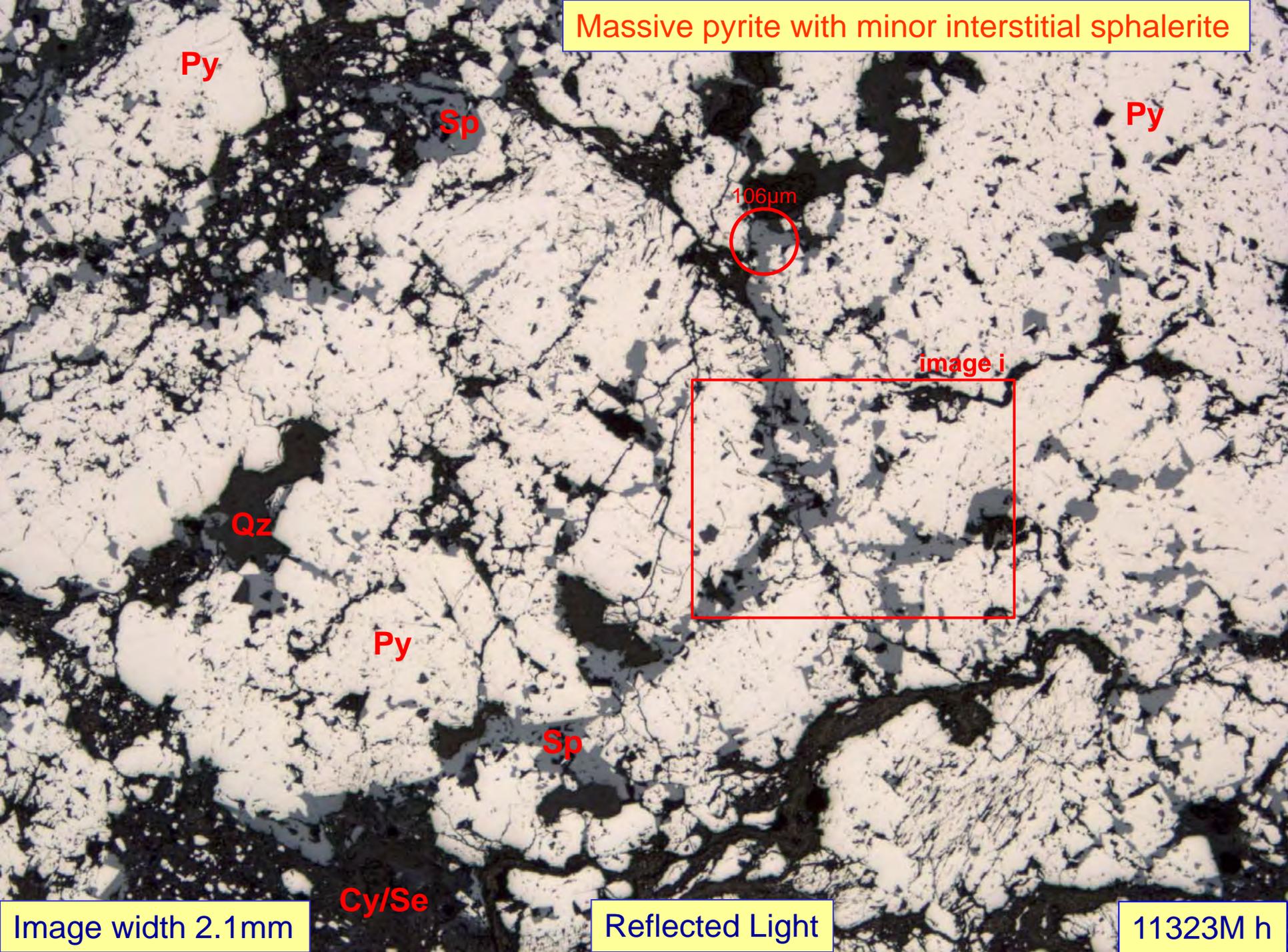
27µm

Image width 515µm

Reflected Light

11323M g

Massive pyrite with minor interstitial sphalerite



Py

Sp

Py

106µm

image i

Qz

Py

Sp

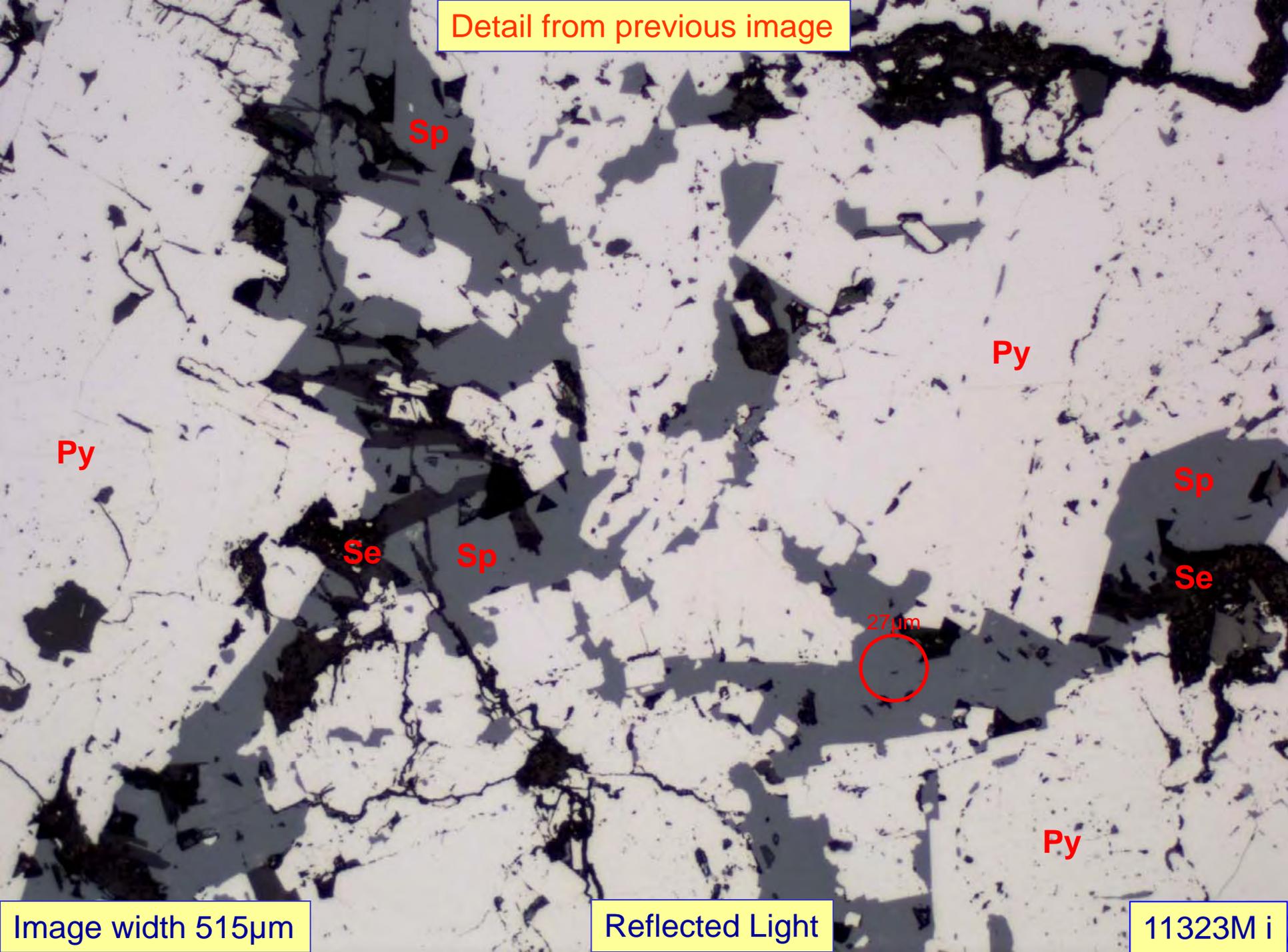
Cy/Se

Image width 2.1mm

Reflected Light

11323M h

Detail from previous image



Sp

Py

Py

Sp

Se

Sp

Se

27 μm

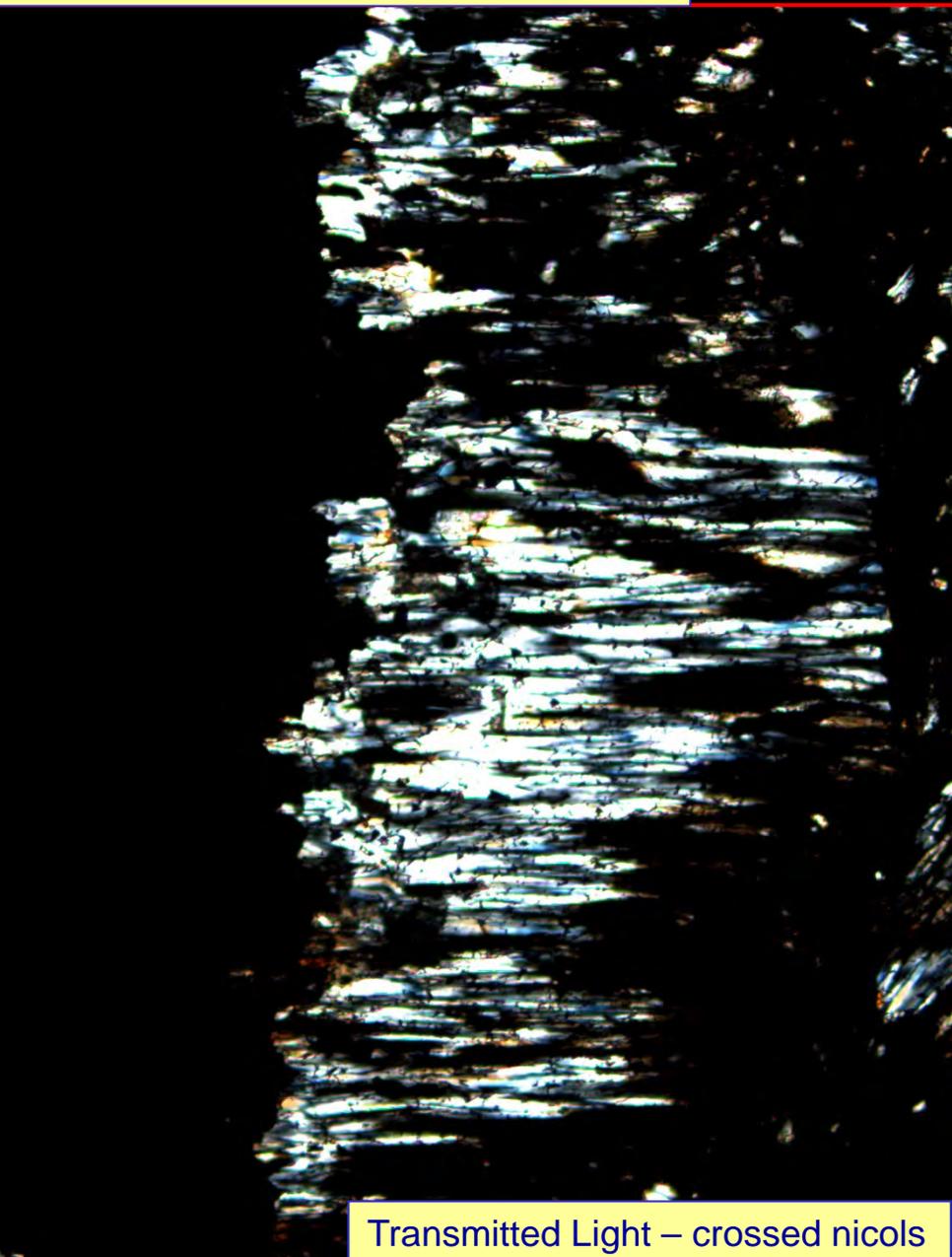
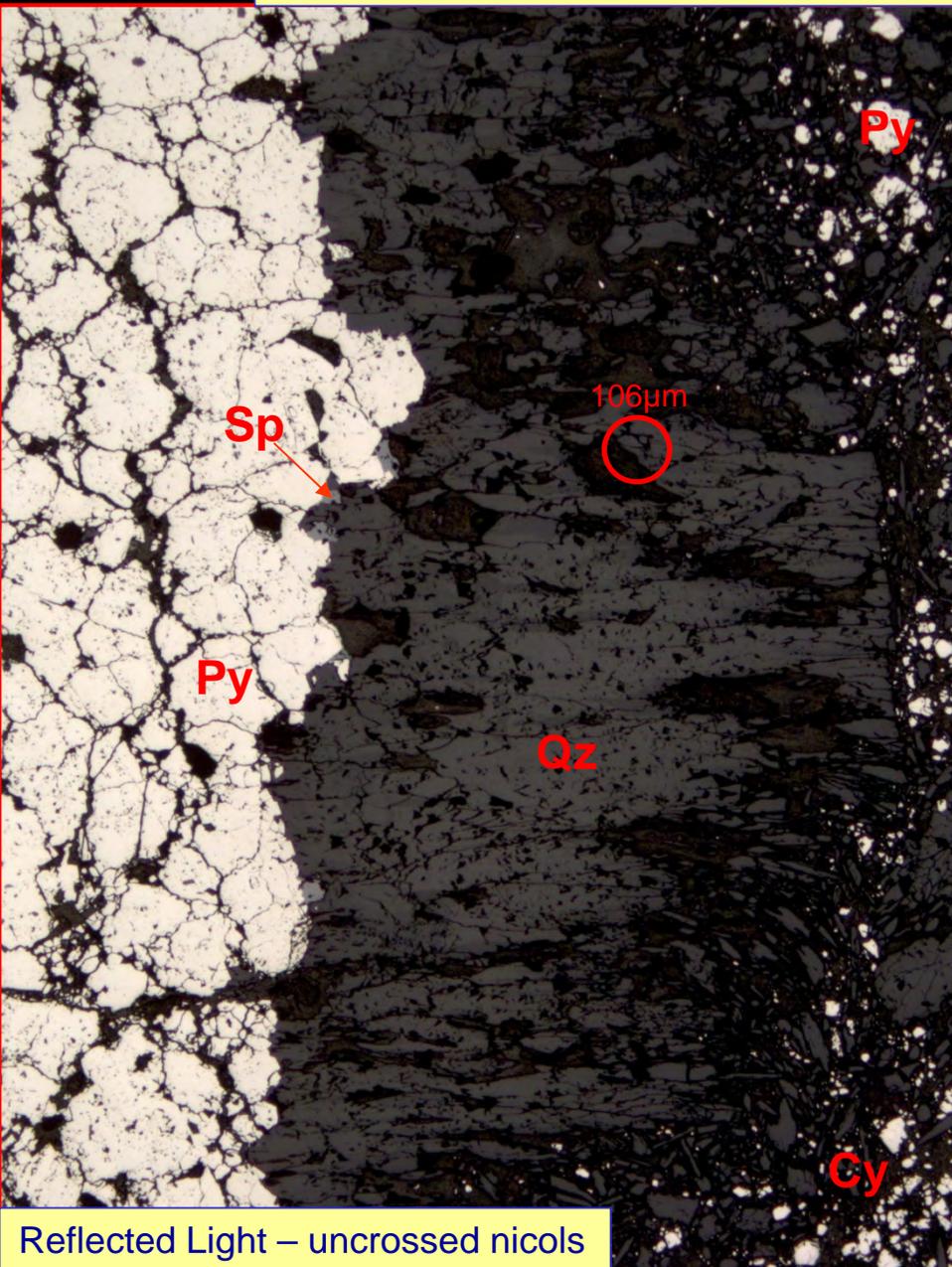
Py

Image width 515 μm

Reflected Light

11323M i

In tact quartz fibres growing in shadow zone of pyrite aggregate



Reflected Light – uncrossed nicols

Transmitted Light – crossed nicols

Image width 2 x 1.6mm

11323M j/k

Quartz fibre debris

53µm

Py

Qz

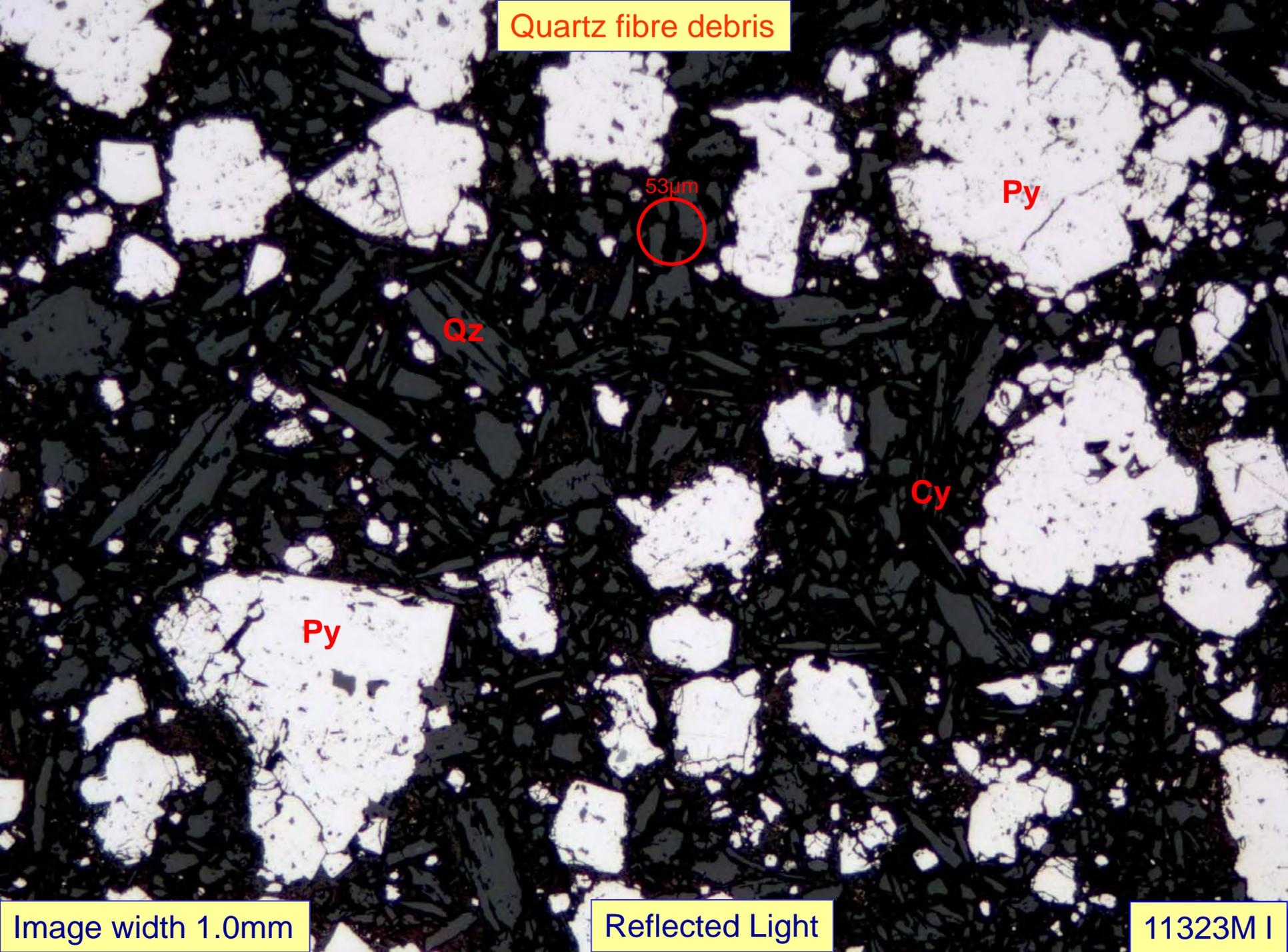
Cy

Py

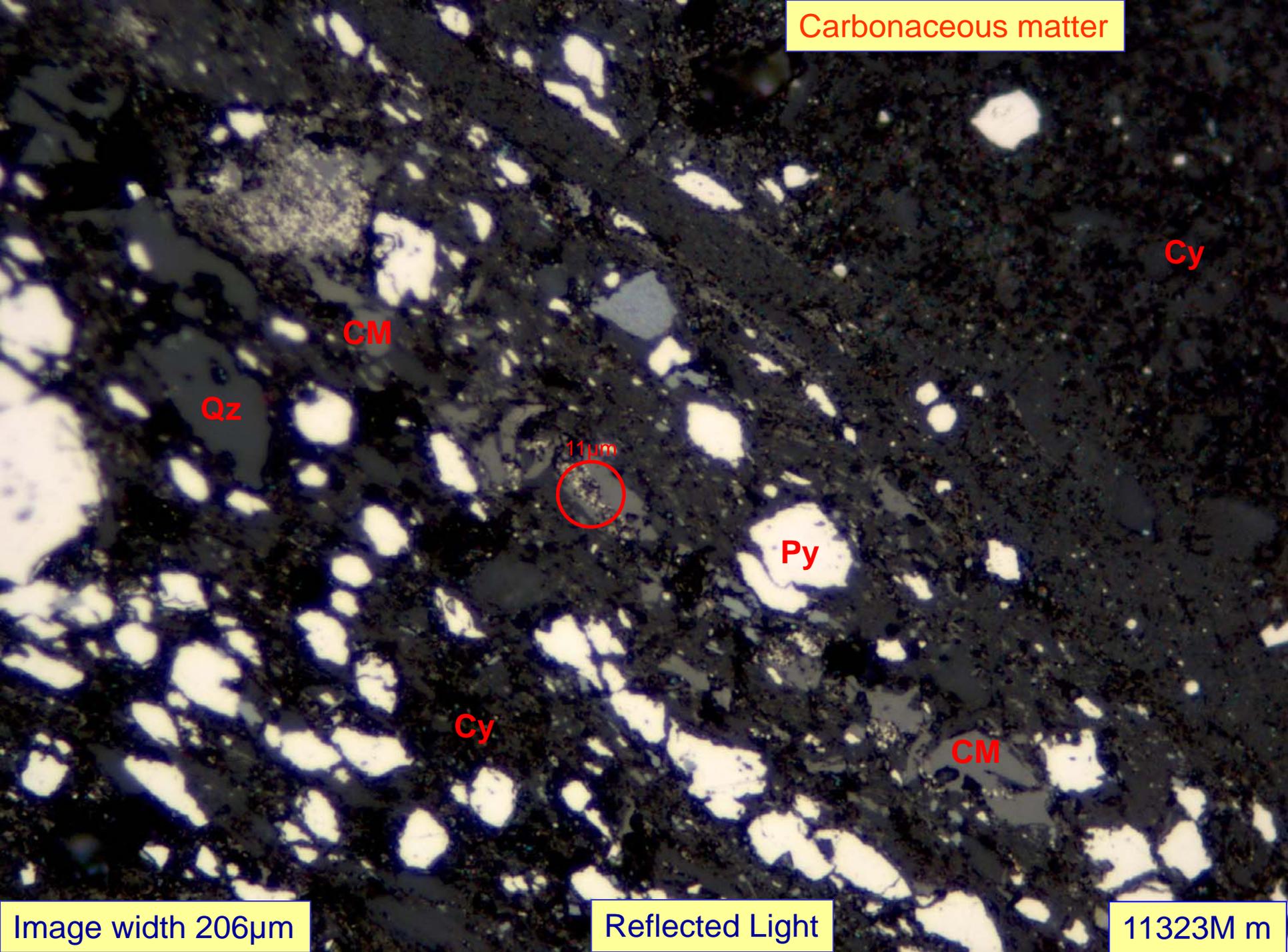
Image width 1.0mm

Reflected Light

11323M I



Carbonaceous matter



Cy

CM

Qz

11µm

Py

Cy

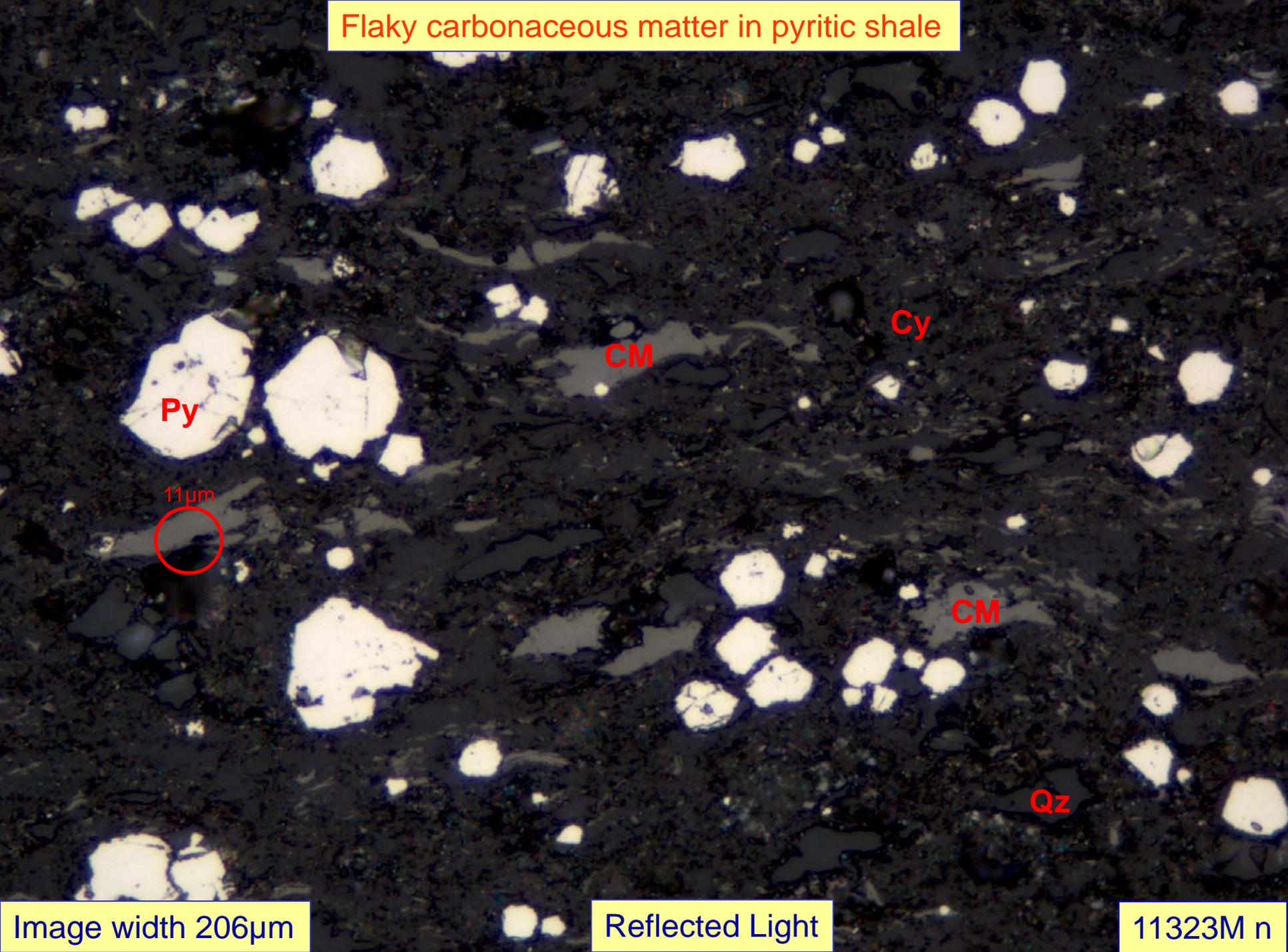
CM

Image width 206µm

Reflected Light

11323M m

Flaky carbonaceous matter in pyritic shale



Py

CM

Cy

11µm

CM

Qz

Image width 206µm

Reflected Light

11323M n

Rare galena blebs in euhedral pyrite

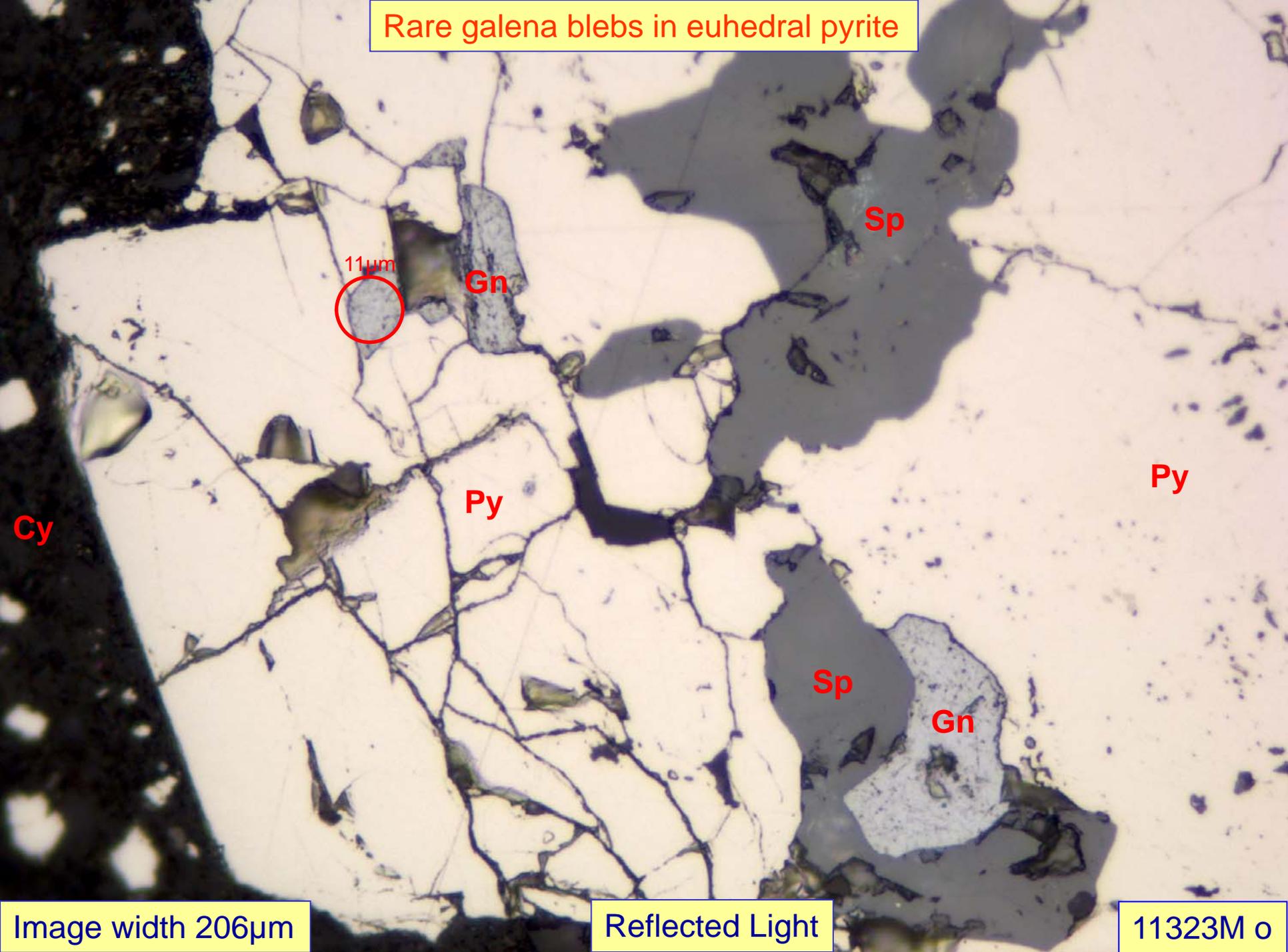


Image width 206µm

Reflected Light

11323M o

Framboidal pyrite

Py

Qz

11µm

Py

Py

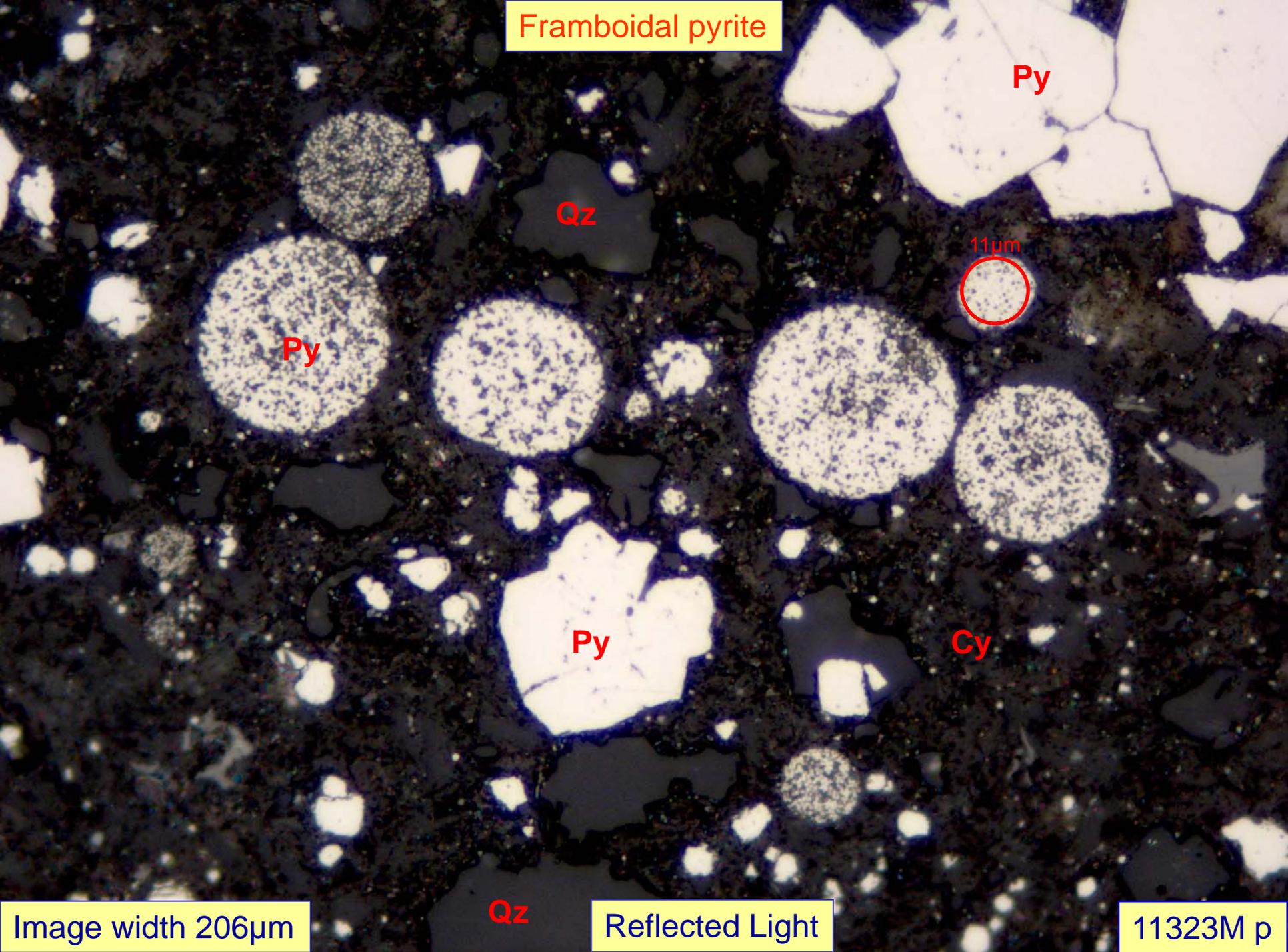
Cy

Qz

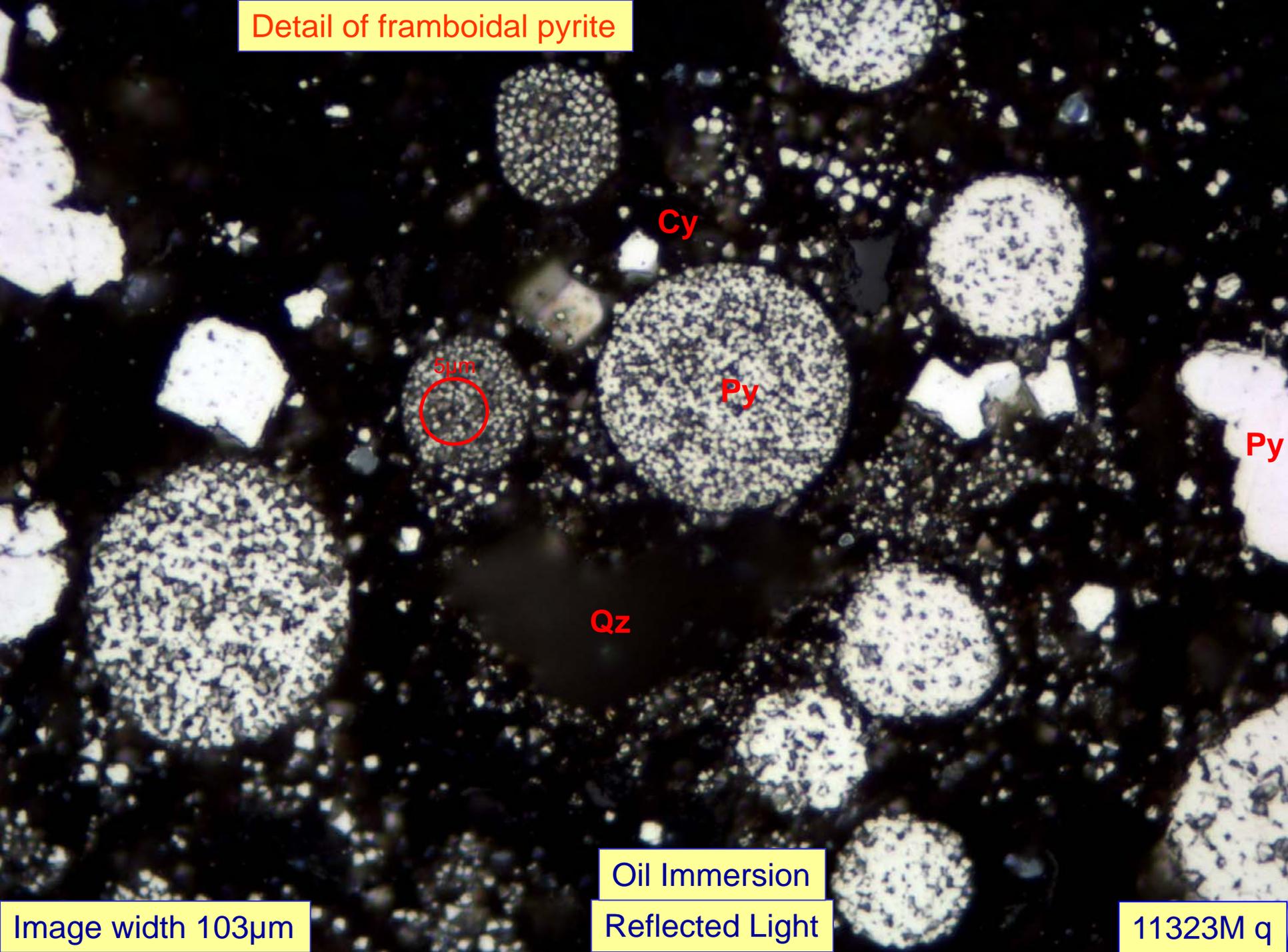
Reflected Light

11323M p

Image width 206µm



Detail of framboidal pyrite



Cy

Py

Py

5µm

Qz

Oil Immersion

Reflected Light

Image width 103µm

11323M q