Electronic Supplementary Material (ESI) for Journal of Materials Chemistry

Supporting Information for

Preparation of a novel functional SiC@polythiophene nanocomposite of a core-shell morphology

by

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Detailed procedure for Kaiser Test (quantification of Primary Amine groups):

The *SiC@PTAA@NH_2 NC* (around 2.0 mg, precisely weighted) was placed in a test tube with 75.0 µL of solution **1**, 75.0 µL of solution **2** and 100.0 µL of solution **3**. Thus, the test tubes were placed in a heating block, preheated to 100ºC, for 3 min. Then, the solution of deionized water/EtOH (4.8 mL, 40% v/v) was added to the each test tube and stirred well. An aliquot (0.5 mL) of this solution was diluted in water/EtOH (4.5 mL, 40% v/v) solution. The amount of grafted amines was measured by UV-absorbance and calculated by the following equation using the Beer-Lambert law: mmol (NH_2)/g material = (Absx5x10x10^3)/(1.5x10^4x (weight of material, mg)). UV absorbance spectra for the Kaiser test were recorded on a Varian CARY 100 Bio UV-Visible spectrophotometer.

Solution **1**: 40 g phenol in 10 ml ethanol. Solution **2**: 2.5 g ninhydrin in 50 ml ethanol. Solution **3**: 65 mg of KCN is dissolved in 100 ml of water. Then, 2 ml of the KCN solution is diluted with 100 ml pyridine.

Table S1

XPS Elemental compositions of SiC and modified core SiC-T NPs

Sample	XPS (atomic concentration, %)				
	O	C	S	Si	S/Si
SiC	28.94	47.99	__	23.07	0
SiC-T	33.28	34.40	0.89	31.43	0.028

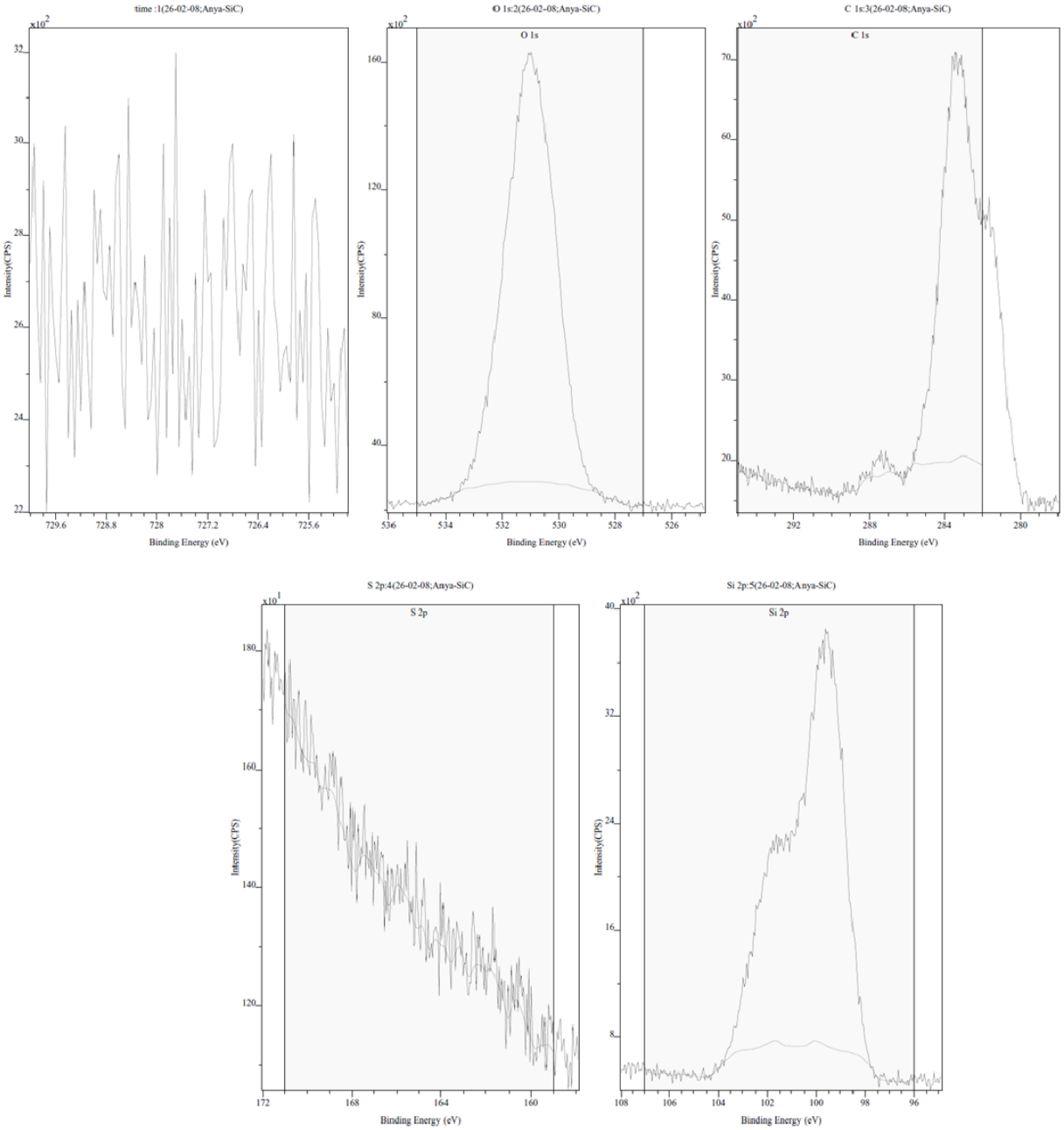


Fig. S1 XPS of bare SiC NPs.

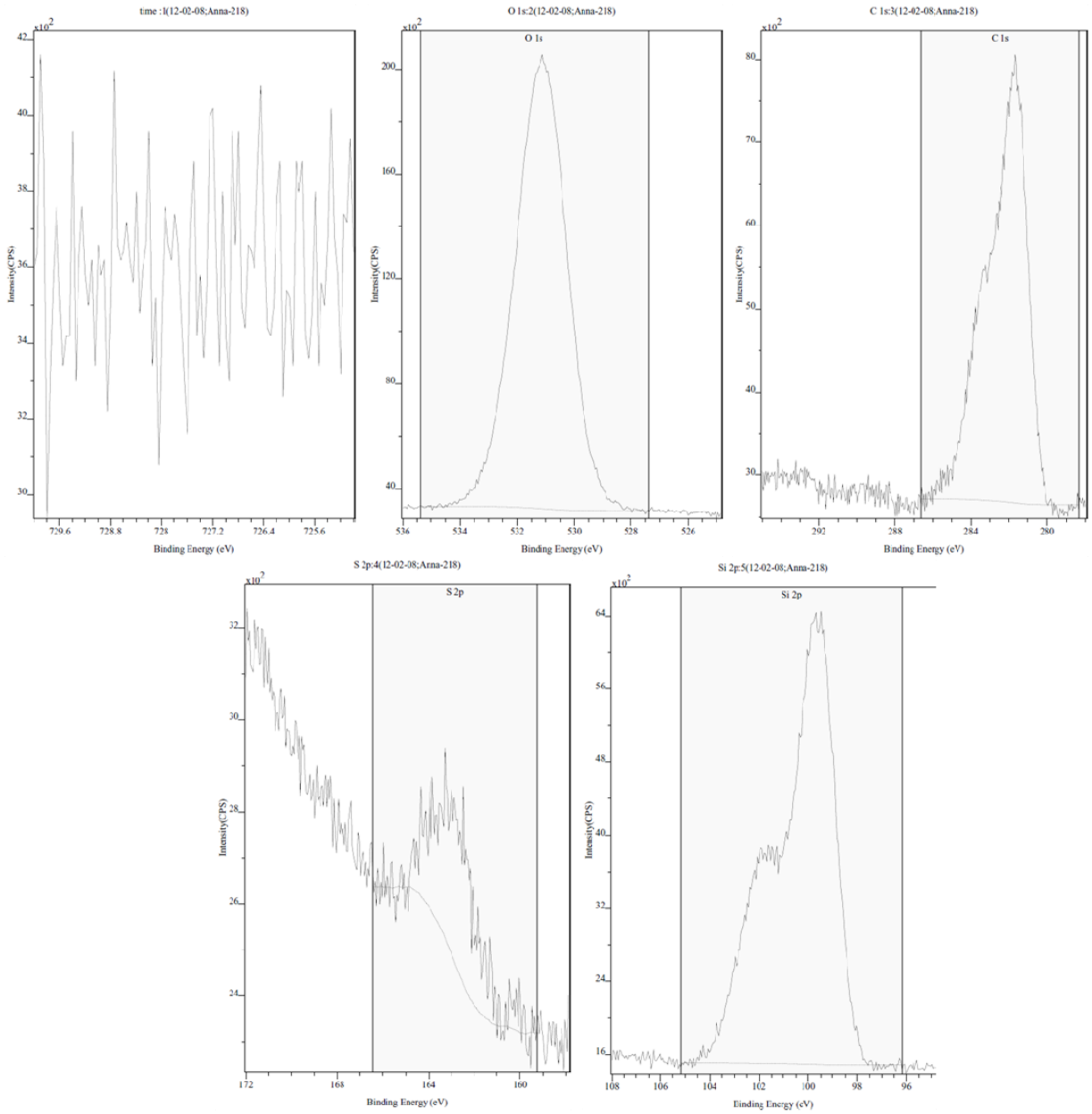


Fig. S2 XPS of modified core SiC-T NPs.

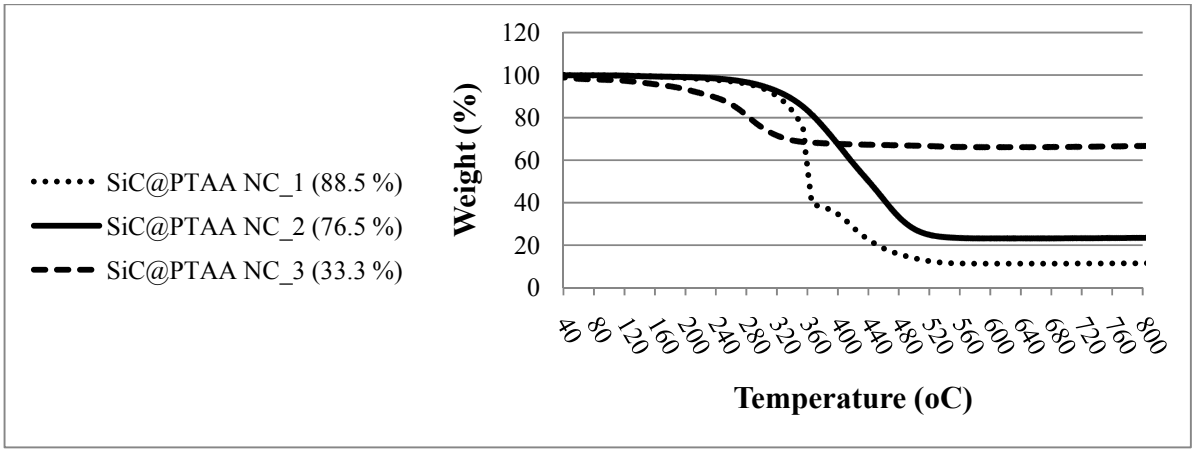
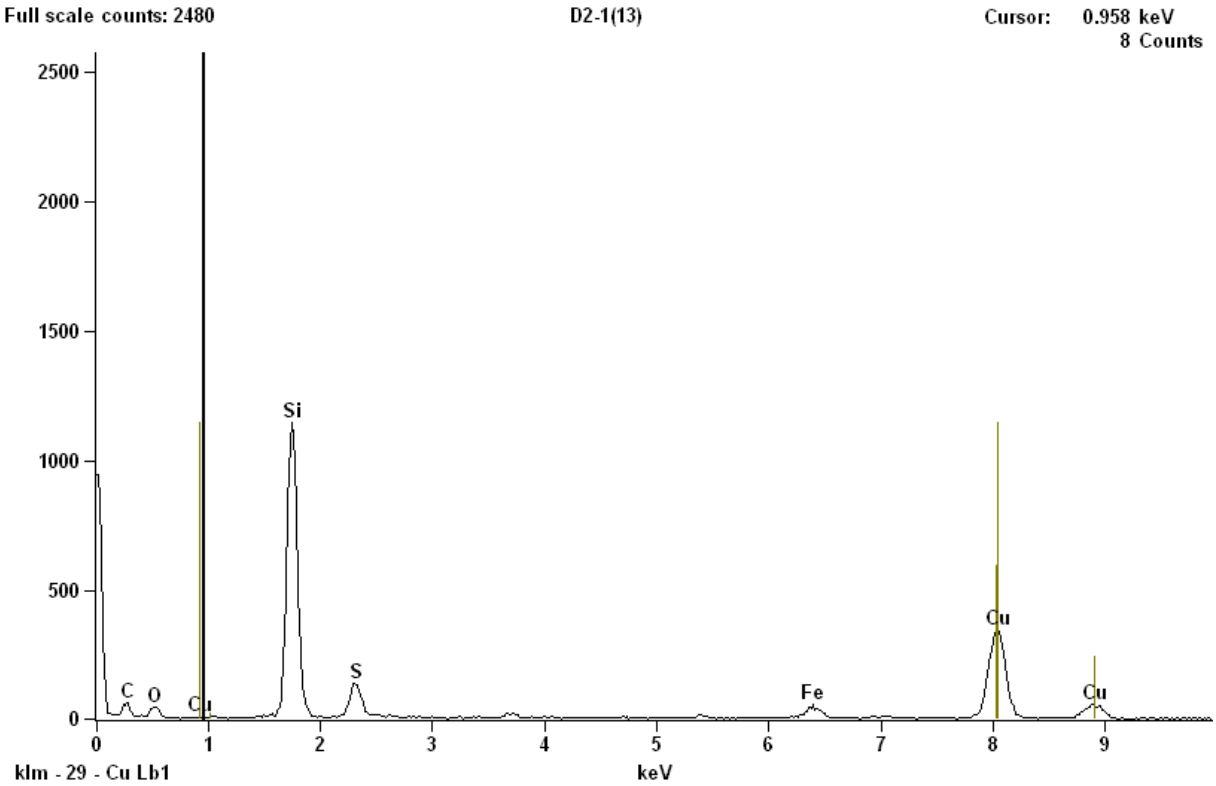


Fig. S3 TGA of SiC@PTAA NC_1-3. TGA was performed in air at a heating rate of 10 ºC/min.

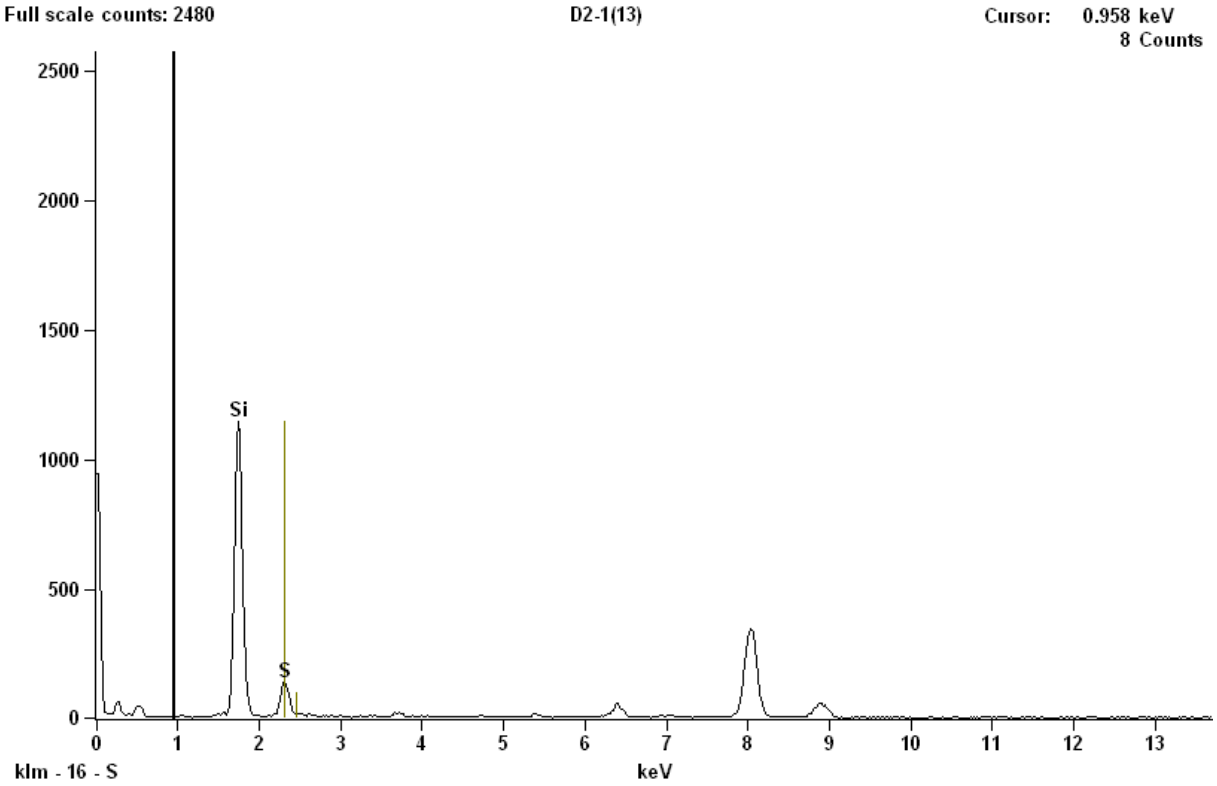
EDS results for: **B point (all detected elements)**



Quantitative Results for: D2-1(13) B point

Element Line	*Weight %*	*Weight % Error*	*Atom %*
C K	20.00	+/- 1.16	41.68
O K	3.71	+/- 0.23	5.80
Si K	39.92	+/- 0.42	35.58
Si L	---	---	---
S K	6.42	+/- 0.28	5.01
S L	---	---	---
Fe K	2.48	+/- 0.15	1.11
Fe L	---	---	---
Cu K	27.46	+/- 0.61	10.81
Cu L	---	---	---
Total	100.00		100.00

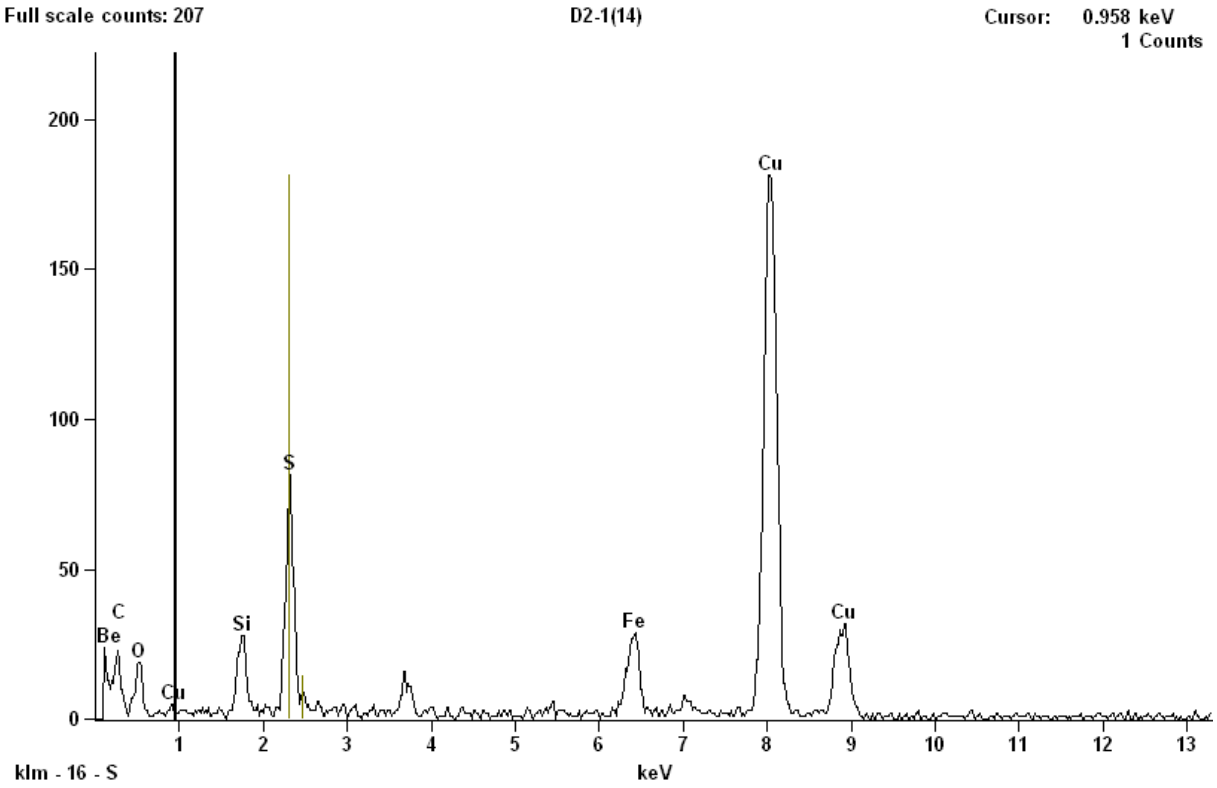
Quantitative Results for: **B point (only S and Si, see Figure 3c)**



Quantitative Results for: **B point**

Element Line	*Weight %*	*Weight % Error*	*Atom %*
Si K	86.15	+/- 0.92	87.65
Si L	---	---	---
S K	13.85	+/- 0.61	12.35
S L	---	---	---
Total	100.00		100.00

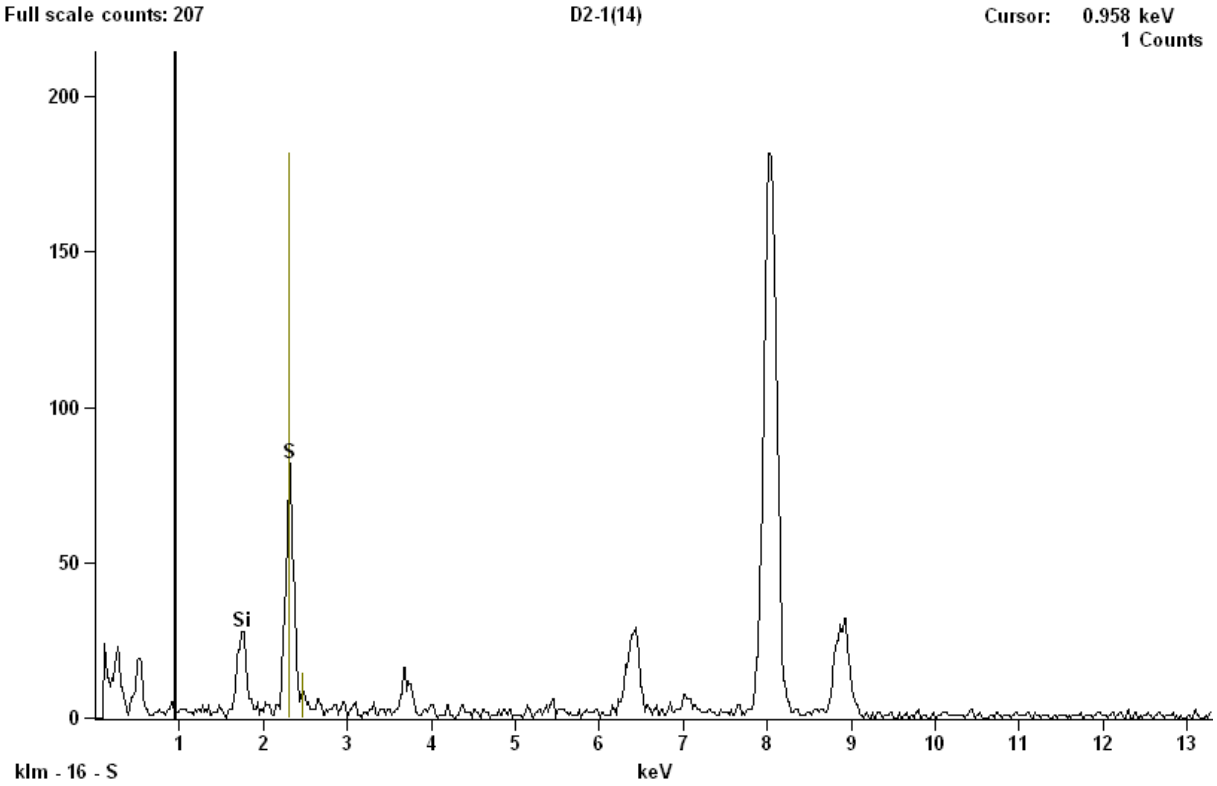
Quantitative Results for: **A point (all detected elements)**



Quantitative Results for: **A point**

Element Line	*Weight %*	*Weight % Error*	*Atom %*
Be K	88.72	+/-11.35	95.52
C K	3.43	+/- 0.32	2.77
O K	0.57	+/- 0.05	0.35
Si K	0.33	+/- 0.03	0.11
Si L	---	---	---
S K	1.16	+/- 0.06	0.35
S L	---	---	---
Fe K	0.59	+/- 0.04	0.10
Fe L	---	---	---
Cu K	5.19	+/- 0.15	0.79
Cu L	---	---	---
Total	100.00		100.00

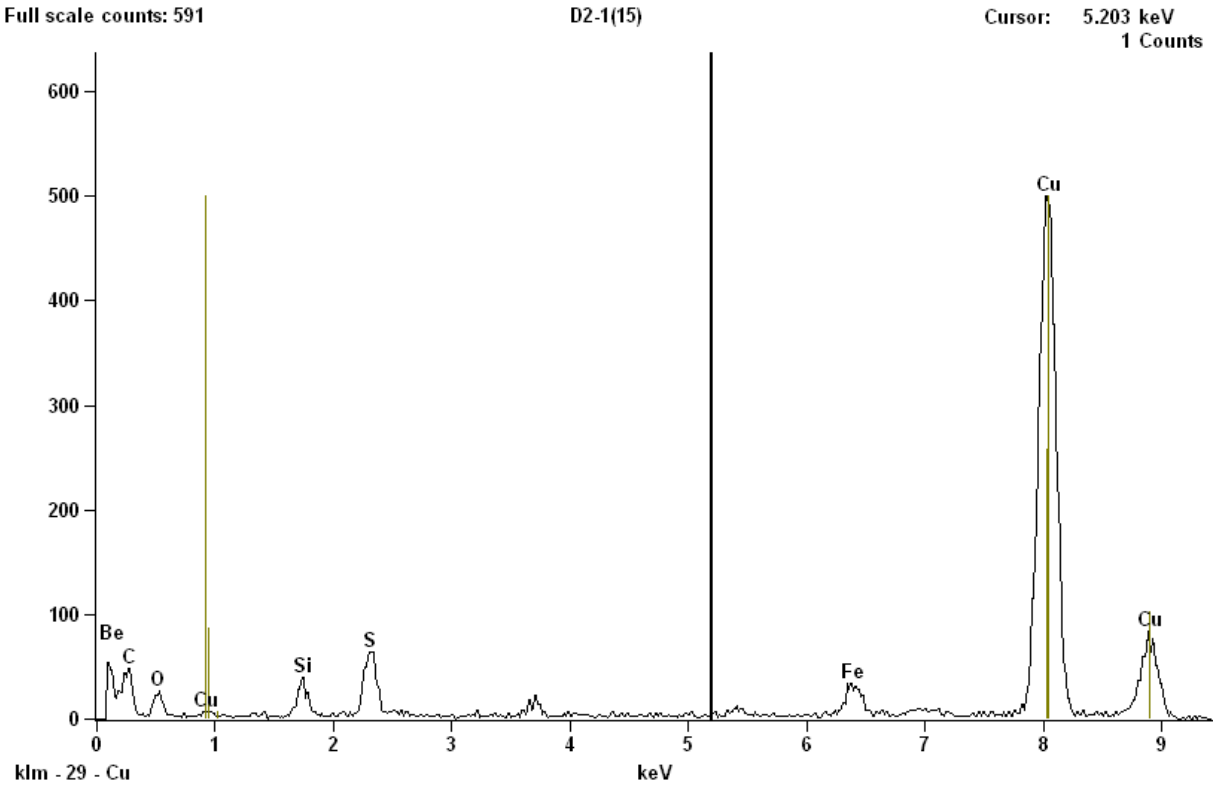
Quantitative Results for: **A point (only S and Si, see Figure 3c)**



Quantitative Results for: **A point**

Element Line	*Weight %*	*Weight % Error*	*Atom %*
Si K	22.24	+/- 2.22	24.61
Si L	---	---	---
S K	77.76	+/- 4.32	75.39
S L	---	---	---
Total	100.00		100.00

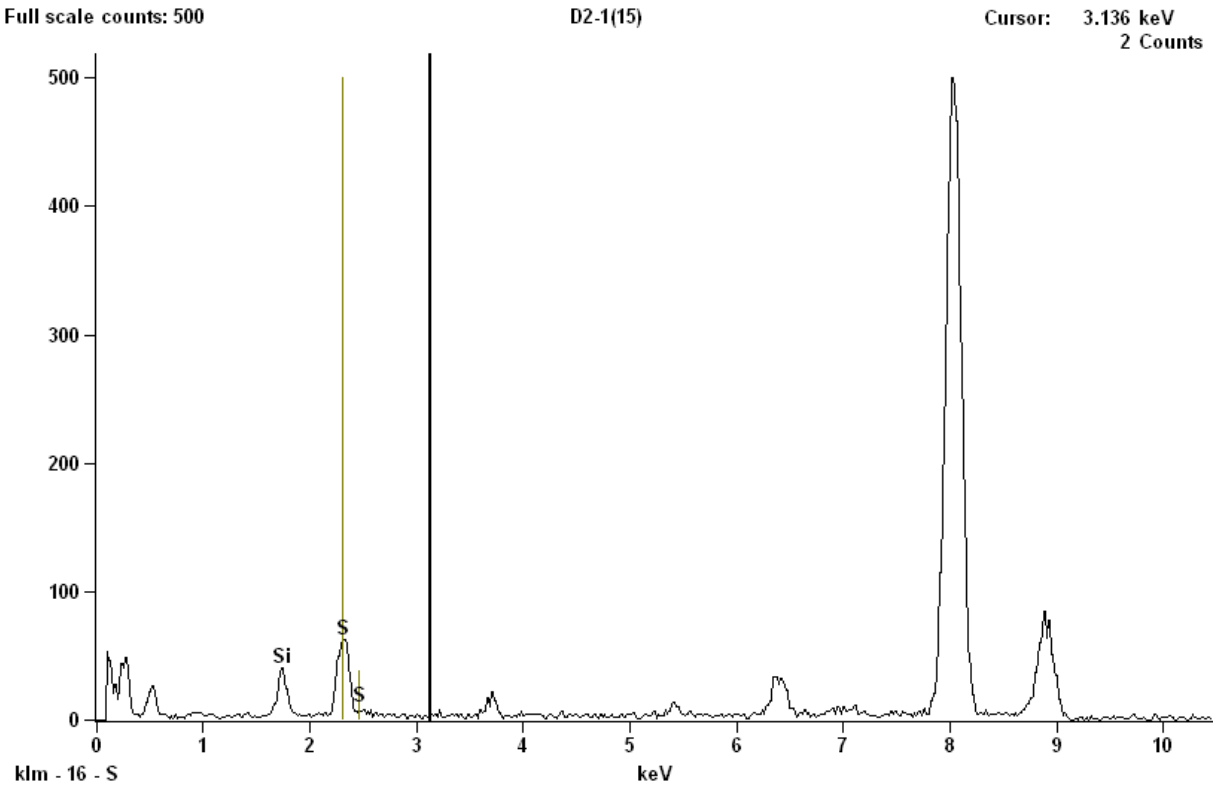
Quantitative Results for: **C point (all detected elements)**



Quantitative Results for: **C point**

Element Line	*Weight %*	*Weight % Error*	*Atom %*
Be K	91.28	+/- 9.32	96.29
C K	3.46	+/- 0.28	2.74
O K	0.23	+/- 0.02	0.14
Si K	0.13	+/- 0.01	0.04
Si L	---	---	---
S K	0.34	+/- 0.02	0.10
S L	---	---	---
Fe K	0.18	+/- 0.02	0.03
Fe L	---	---	---
Cu K	4.38	+/- 0.08	0.65
Cu L	---	---	---
Total	100.00		100.00

Quantitative Results for: **C point (only S and Si, see Figure 3c)**



Quantitative Results for: **C point**

Element Line	*Weight %*	*Weight % Error*	*Atom %*
Si K	26.77	+/- 2.51	29.44
Si L	---	---	---
S K	73.23	+/- 4.51	70.56
S L	---	---	---
Total	100.00		100.00