

TitaniumDioxide Coated Silica Nanosprings<sup>TM</sup> 1/4

<b>MATERIAL DATA SHEET</b>	
PHYSICAL INFORMATION	
MATERIAL:	TitaniumDioxide coated silica Nanosprings <sup>TM</sup>
COLOR:	White
COMPOSITION:	Conformal coating on SiO <sub>2</sub> nanosprings <sup>TM</sup> . Nanosprings <sup>TM</sup> are form of multiple springs attached to a substrate
STRUCTURE:	Crystalline on amorphous silica nanosprings <sup>TM</sup> .
NANOSPRING <sup>TM</sup> MASS:	0.5±0.085 mg/cm <sup>2</sup>
COATING MASS:	0.66±0.04 mg/cm <sup>2</sup>
TOTAL MASS:	0.56±.01 mg/cm <sup>2</sup>
WIRE DIAMETER:	163±49.6 nm
COIL DIAMETER:	254±60.8 nm
COIL PITCH:	277±100.3 nm
CRYSTAL SIZE:	32.6±8.6 × 36.7±8.1 nm
NANOPARTICLE SIZE:	NA
MELTING POINT:	1000°C
MAXIMUM TEMPERATURE:	Substrate dependent, if below melting point.
SUBSTRATE:	Al foils, SST, glass, glass frits, Si wafers, cordierite, fiberglass cloth

CHARACTERIZATION

fe-SEM

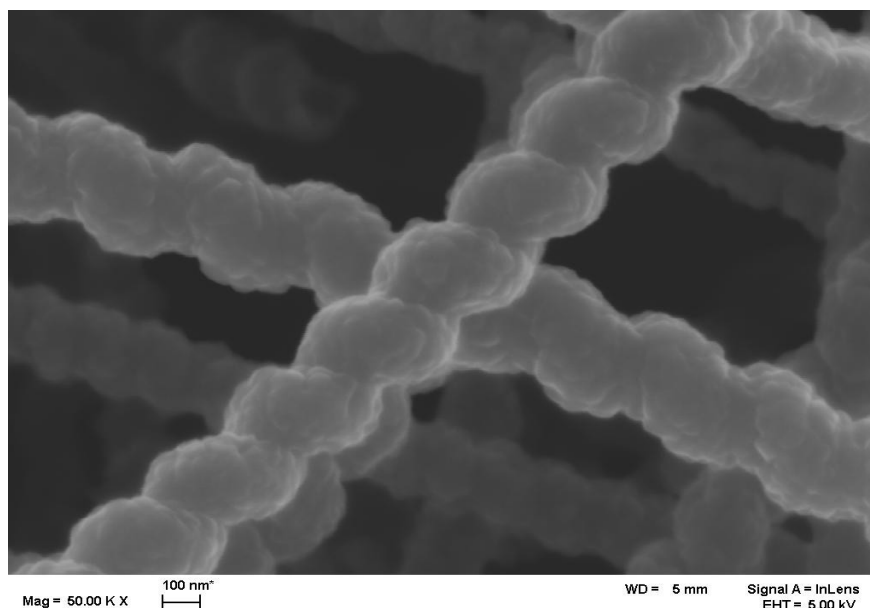


Figure 1: fe-SEM image of TiO<sub>2</sub> coated Nanosprings<sup>TM</sup>

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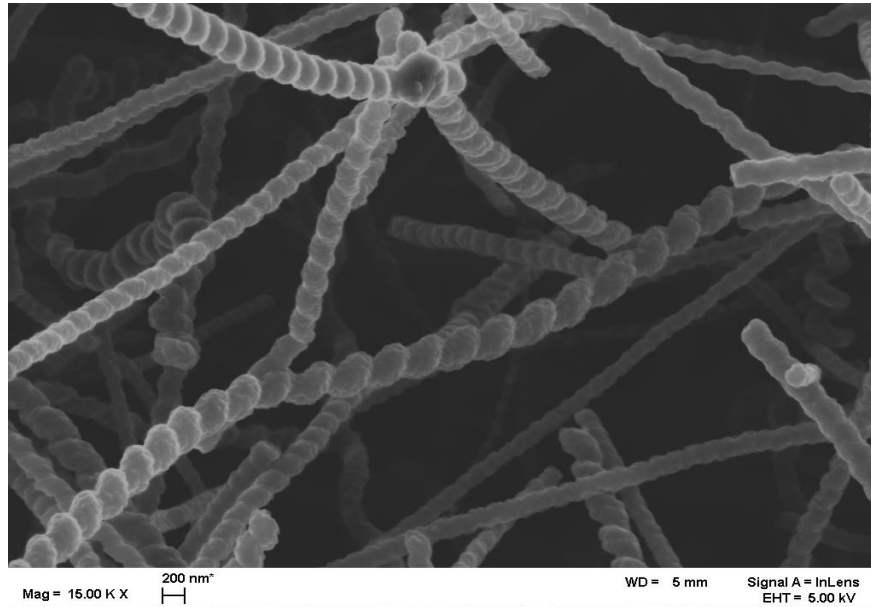


Figure 2: fe-SEM image of  $\text{TiO}_2$  coated Nanosprings<sup>TM</sup>

TEM

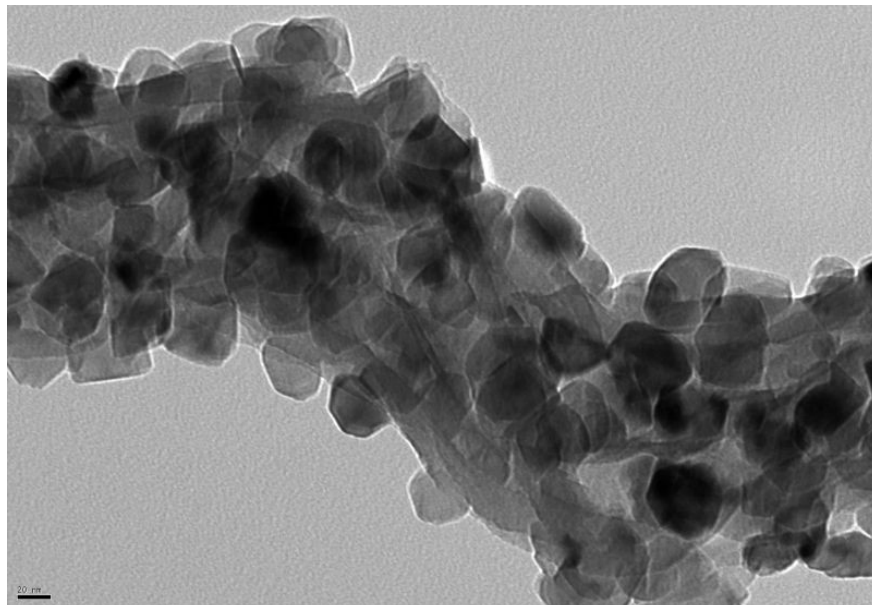
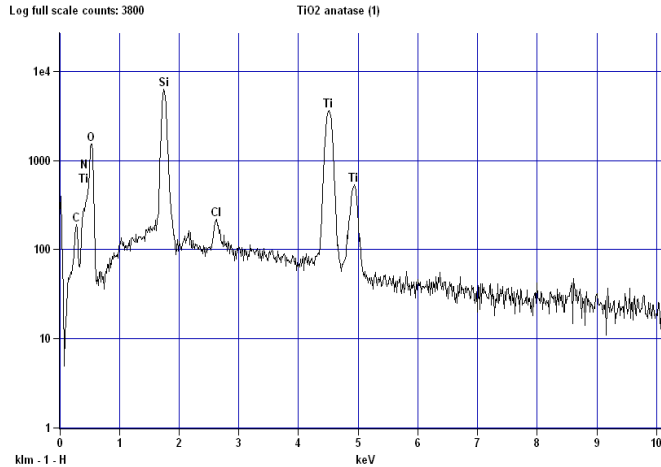


Figure 3: TEM image of  $\text{TiO}_2$  coated Nanosprings<sup>TM</sup>

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Elemental Analysis

fe-SEM-EDS



Element Line	Net Counts	Net Counts Error	Weight %	Weight % Error	Atom %	Atom % Error
C K	718	+/- 52	3.03	+/- 0.22	5.99	+/- 0.43
N K	0	+/- 89	0.00	---	0.00	+/- 0.00
O K	8952	+/- 113	38.23	+/- 0.48	56.87	+/- 0.72
Si K	55383	+/- 303	22.43	+/- 0.12	19.01	+/- 0.10
Cl K	1163	+/- 69	0.53	+/- 0.03	0.36	+/- 0.02
Ti K	49819	+/- 333	35.78	+/- 0.24	17.77	+/- 0.12
<b>Total</b>			100.00		100.00	

Figure 4: fe-SEM EDS of TiO<sub>2</sub> coated Nanosprings<sup>TM</sup>

XRD

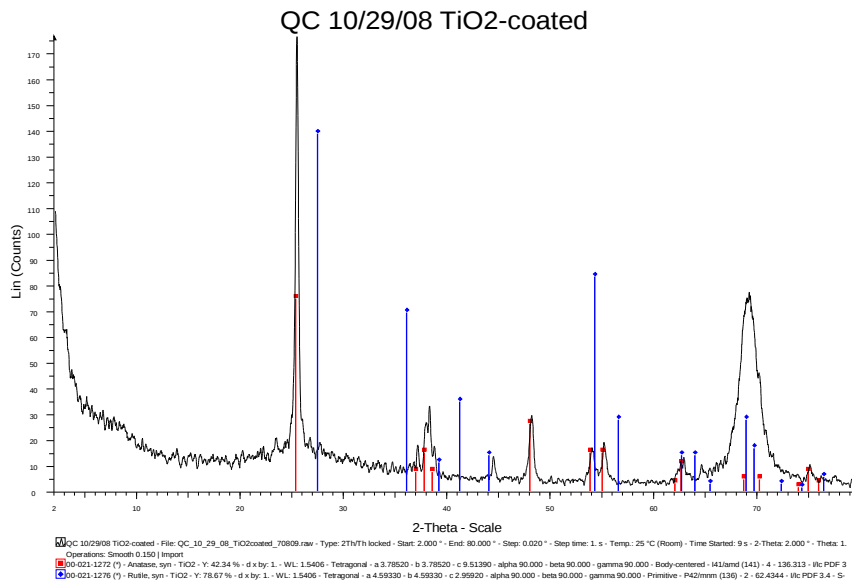


Figure 5: XRD of TiO<sub>2</sub> coated Nanosprings<sup>TM</sup>

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Chemical Analysis

XPS

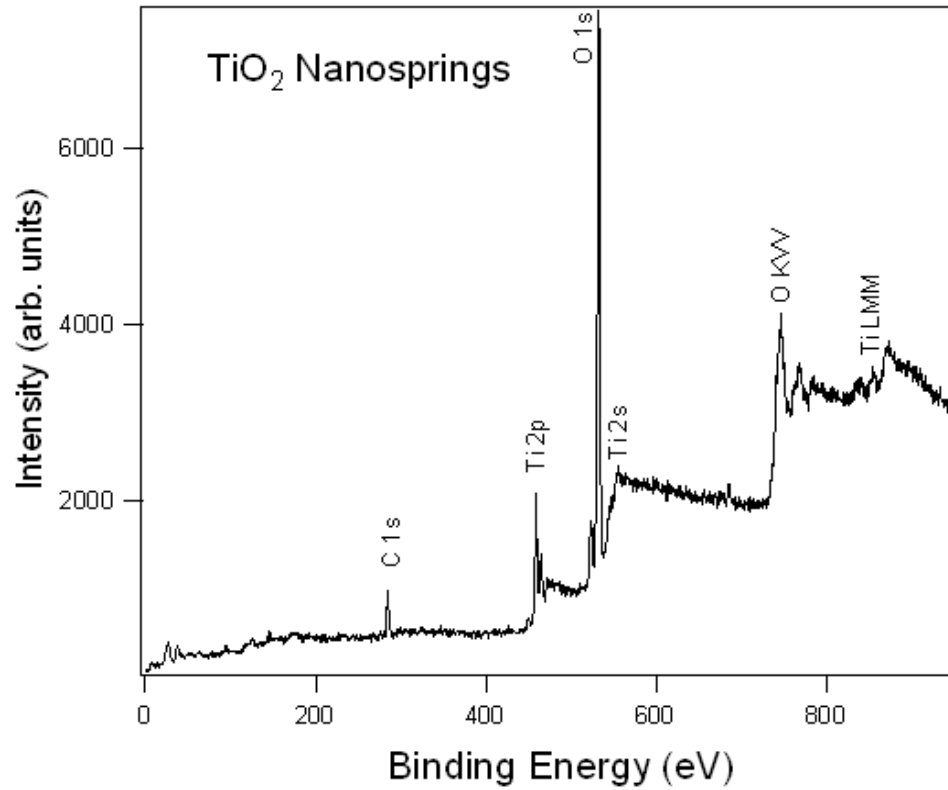


Figure 6: XPS of TiO<sub>2</sub> coated Nanosprings<sup>TM</sup>