

## Supporting Information

### **A comparative study for the characterization of polyaniline based nanocomposites and membrane properties**

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Table S-1 Conditions for the synthesis of PANI-Ti(IV)W cation exchanger.

S.No	A	B	C (%) v/v	Mixing ratio v/v/v	Temperature (°C)	pH	Appearance of bead	IEC for Na <sup>+</sup>	Yield (g)
T-1	0.25	0.1	--	1:1	25±2	0.5	White granular	0.25	1.68
T-2	0.25	0.1	--	1:1	25±2	1.0	White granular	0.60	1.96
T-3	0.25	0.1	--	1:1	100±2	1.0	White granular	0.40	1.85
T-4	0.25	0.1	10	1:1	25±2	1.5	Green granular	0.35	2.95
T-5	0.25	0.1	10	1:1:1	25±2	0.5	Green granular	0.65	2.33
T-6	0.25	0.1	10	1:1:1	25±2	1.0	Green granular	0.85	2.99
T-7	0.25	0.1	10	1:1:1	100±2	1.0	Green granular	0.70	3.00
T-8	0.25	0.1	10	1:1:1	25±2	1.5	White granular	0.55	3.25

Sodium tungstate (Mol L<sup>-1</sup>), B. Titanium tetrachloride (Mol L<sup>-1</sup>), C. (stock solution of 10 % PANI), IEC. Ion Exchange Capacity (meq g<sup>-1</sup>)

TablesS-2 Conditions for the synthesis of PANI-Ti(IV)As cation exchanger.

S.No	A	B	C (%) v/v	Mixing ratio v/v/v	Temperature (°C)	pH	Appearance of bead	IEC for Na <sup>+</sup> ions	Yield (g)
A-1	0.25	0.1	--	1:1	25±2	0.5	White granular	0.75	1.62
A-2	0.20	0.1	--	1:1	25±2	1.0	White granular	0.99	1.96
A-3	0.25	0.1	--	1:1	100	1.0	White granular	0.70	2.01
A-4	0.25	0.1	--	1:1	25±2	1.5	Green granular	1.00	2.90
A-5	0.25	0.1	10	1:1:1	25±2	0.5	Green granular	1.10	2.30
A-6	0.25	0.1	10	1:1:1	25±2	1.0	Green granular	1.37	3.99
A-7	0.25	0.1	10	1:1:1	100	1.0	Green granular	1.00	3.30
A-8	0.25	0.1	10	1:1:1	25±2	1.5	White granular	0.90	3.45

A. Sodium arsenate (Mol L-1), B. Titanium tetrachloride (Mol L-1), C. (stock solution of 10 % PANI), IEC. Ion Exchange Capacity (meq g-1)

Table S-3 Conditions for the synthesis of nanocomposite PANI-Zr(IV)sulphosalicylate cation exchanger at 25± 2 °C.

S. No	A	B	C (%)	Mixing ratio v/v/v	pH	Appearance of bead	IEC for Na <sup>+</sup> ions	Yield (g)
S-1	0.25	0.5	--	1:1	0.5	White granular	---	----
S-2	0.25	0.5	--	1:1	1.0	White granular	1.05	2.46
S-3	0.25	0.5	--	1:1	1.5	White granular	0.70	2.50
S-4	0.25	0.5	10	1:1:1	0.5	Green granular	1.25	2.54
S-5	0.25	0.5	10	1:1:1	1.0	Green granular	1.80	3.54
S-6	0.25	0.5	10	1:1:1.5	1.0	Green granular	1.24	2.94
S-7	0.25	0.5	10	1:1:1	1.5	Green granular	1.20	3.90
S-8	0.25	0.5	12	1:1:1	1.0	Light green granular	1.54	2.90
S-9	0.25	0.5	15	1:1:1	1.0	Dark green granular	1.40	2.98

A. Zirconium oxychloride (Mol L-1), B. Sulphosalicylate (Mol L-1), C. (stock solution of 10 % PANI), IEC. Ion Exchange Capacity (meq

g-1)

**Figure captions:**

**Fig. S-1 FTIR spectra of nanocomposite materials.**

**Fig. S-2 TGA curves of nanocomposite materials.**

**Fig. S-3 Powder XRD patterns of nanocomposite materials.**

**Fig. S-4 SEM images of nanocomposite materials.**

**Fig. S-5 TEM images nanocomposite materials.**

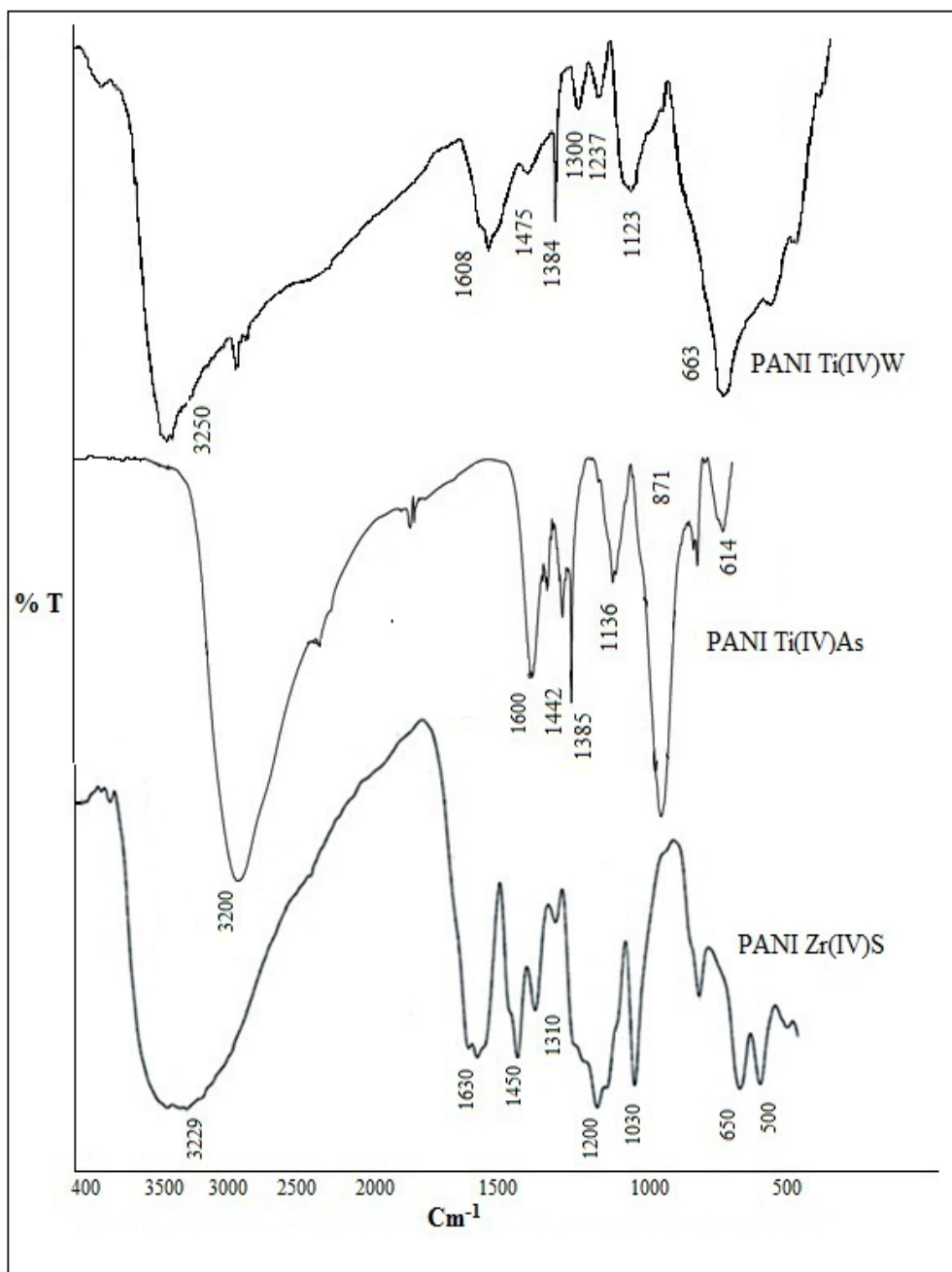


Fig. S-1

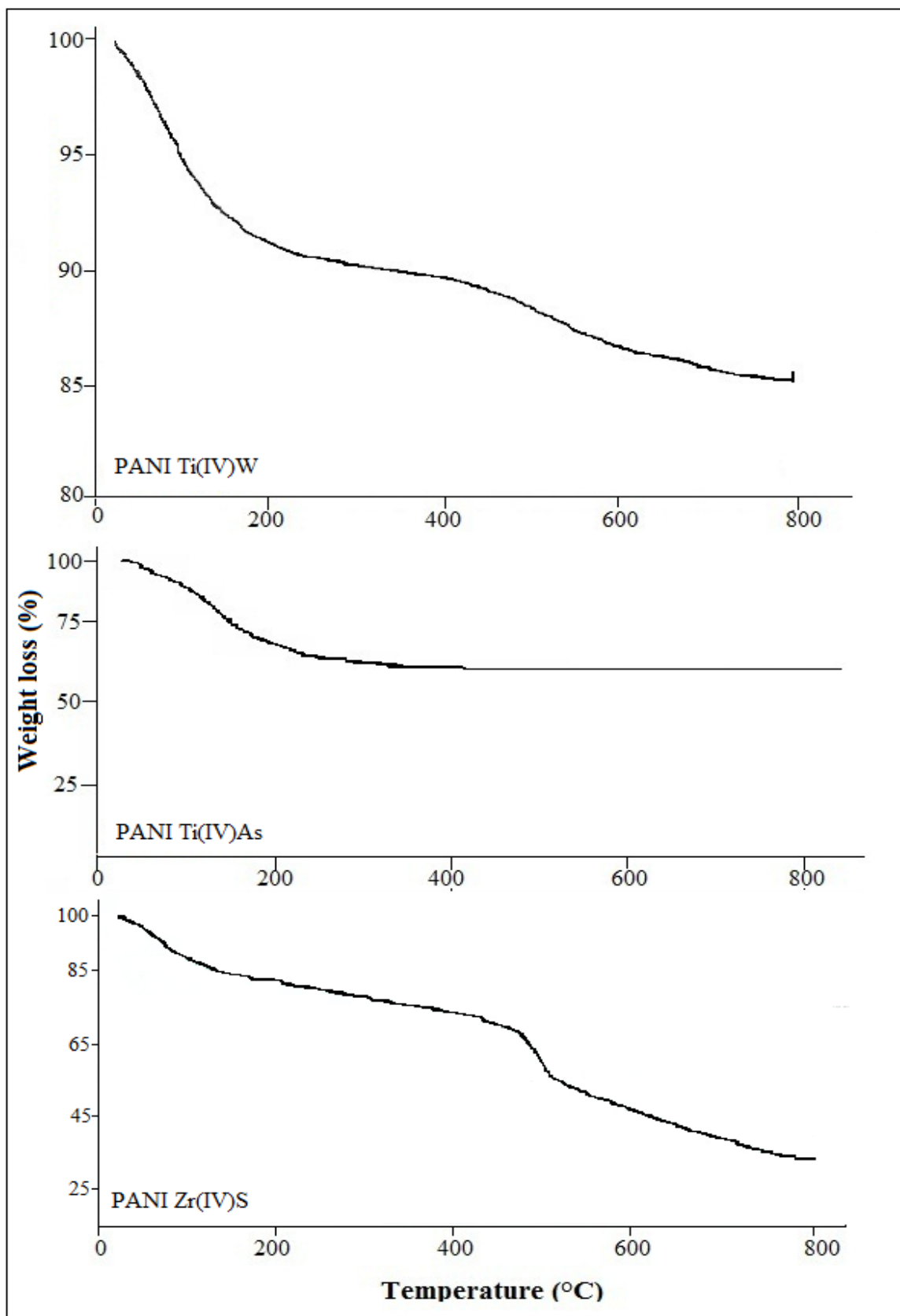


Fig. S-2

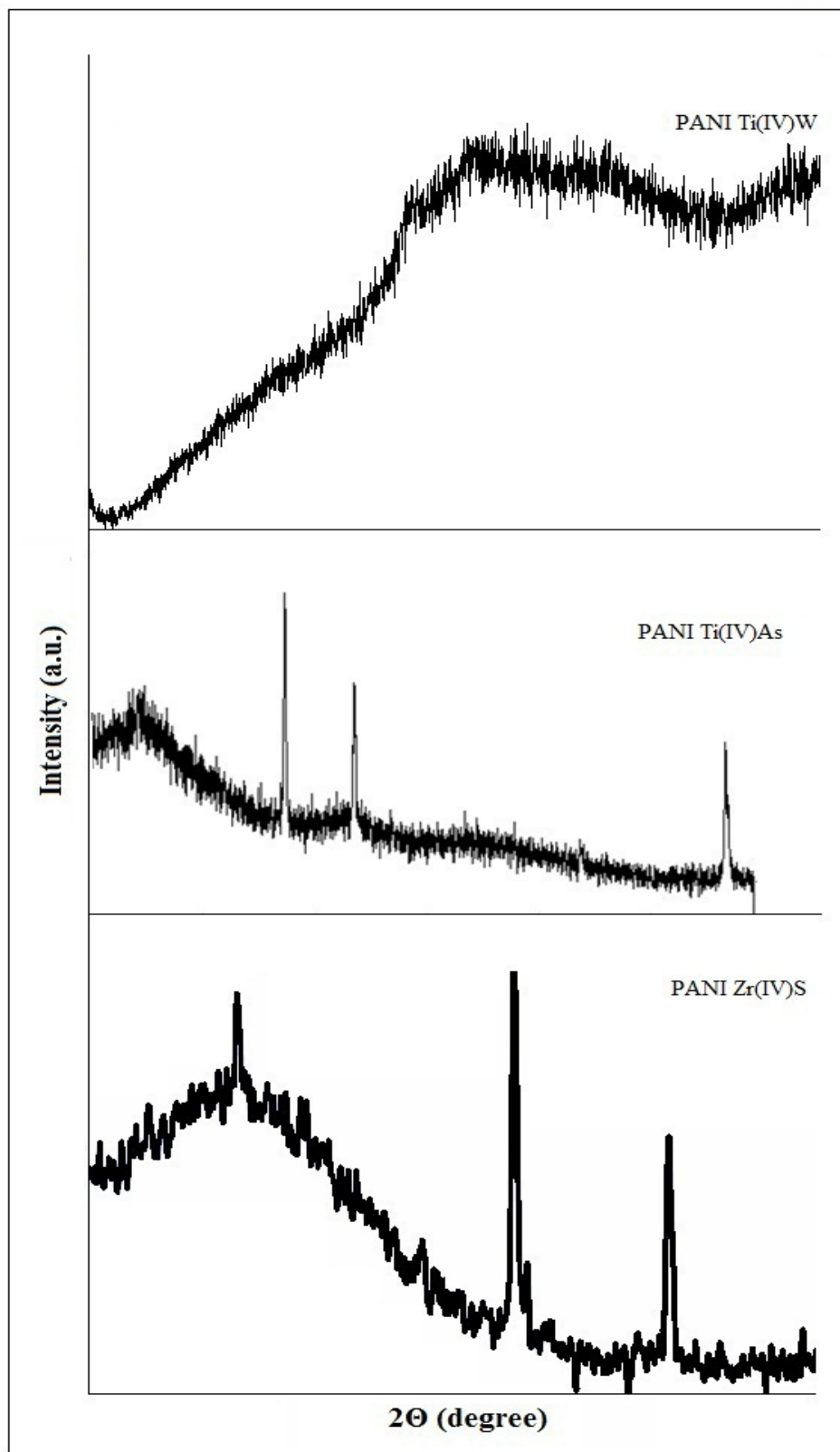


Fig. S-3

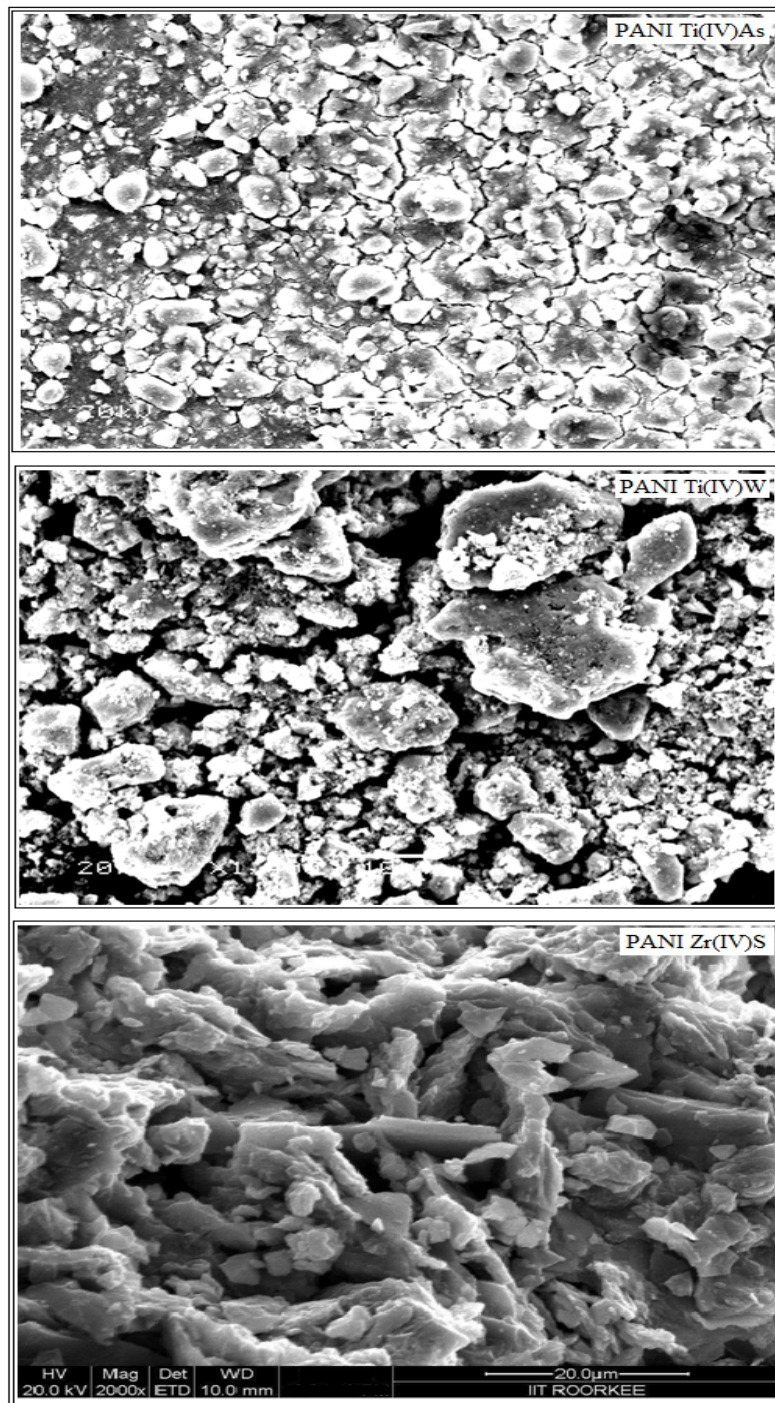


Fig. S-4

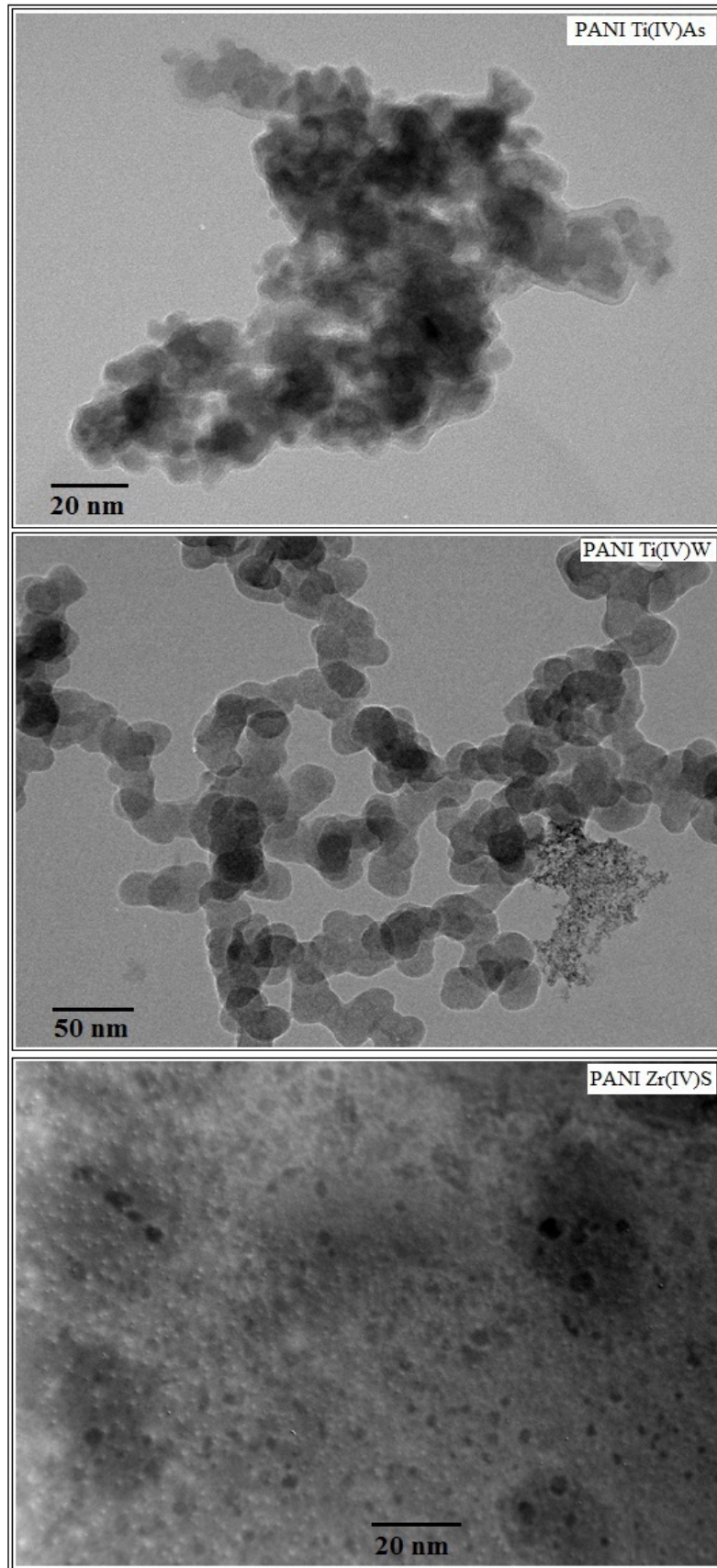


Fig. S-5