SUPPORTING INFORMATION

In-situ synthesis of high-performance 4,4`-diaminodiphenylsulfone modified oleo-alkyd nanocomposite coatings: Role of hybrid nanofillers on physico-mechanical, hydrophobic and corrosion protective performance".

Mohammad Irfan Bakshi[1], Sharif Ahmad* (corresponding author)

Authors Detail

[1]Mohammad Irfan Bakshi

Materials Research Laboratory

Department of Chemistry,

Jamia Millia Islamia (A Central University)

New Delhi-110025, India

E-mail address: itzirfanchemscholar@gmail.com

[1]Sharif Ahmad*

Materials Research Laboratory

Department of Chemistry,

Jamia Millia Islamia (A Central University)

New Delhi-110025, India

Tel no. +91 11 26827508 Fax: +91 11 26840229

E-mail address: sharifahmad_jmi@yahoo.co.in

***Corresponding Author**

Cover Sheet

1. Total Number of Pages **S1-6 (6 Pages)**

2. Total Number of Fig. **4**

3. Total Number of Tables **4**

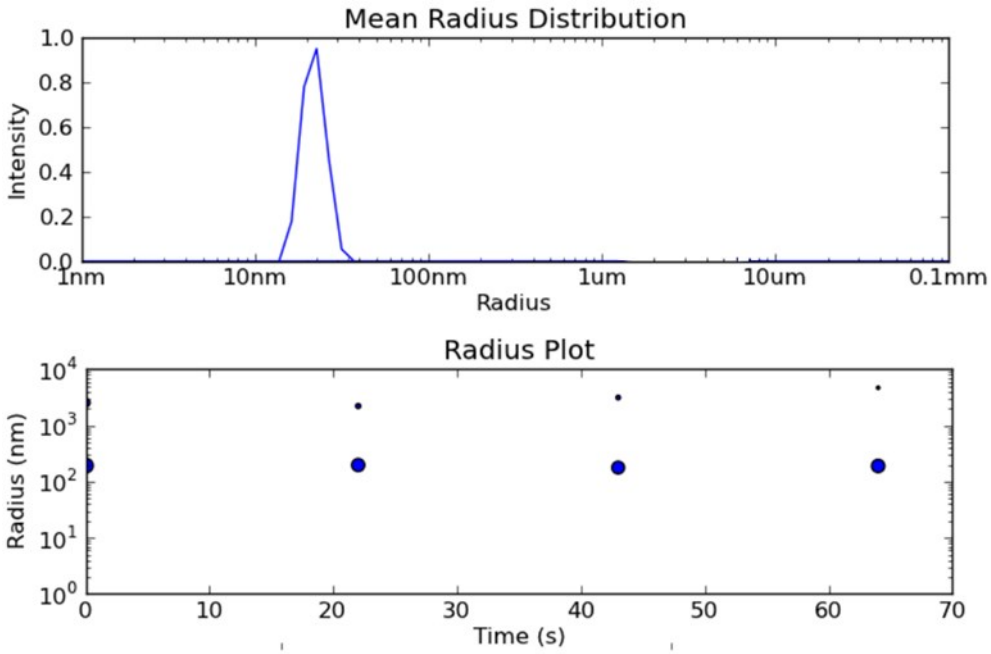

Fig. S1. Dynamic light scattering of hybrid PPy-PSCeO_2 nanofiller.

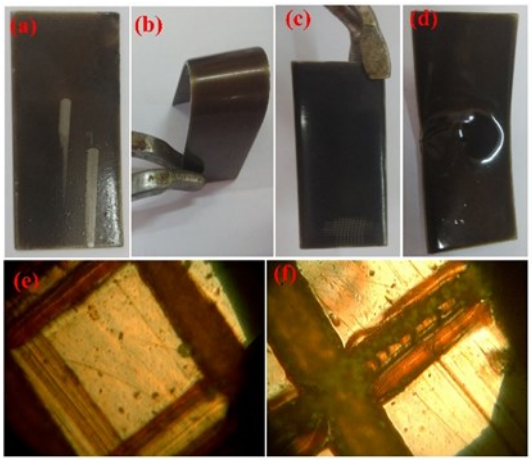

Fig. S2. Visual performance depicting Physico-mechanical studies of (a)scratch hardness, (b)bend test, (c)cross hatch tests (d)impact resistance of alk-DDS-PPy-PSCeO_2-1.5 nanocomposites and Optical micrographs of (e), (f) alk-DDS-PPy-PSCeO_2-1.5 at resolution 100x.

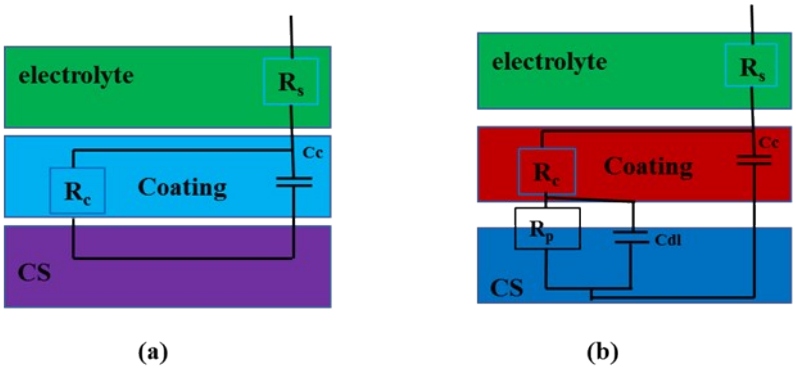

Fig. S3 Equivalent fitted circuit (EEC) fitted in EIS.

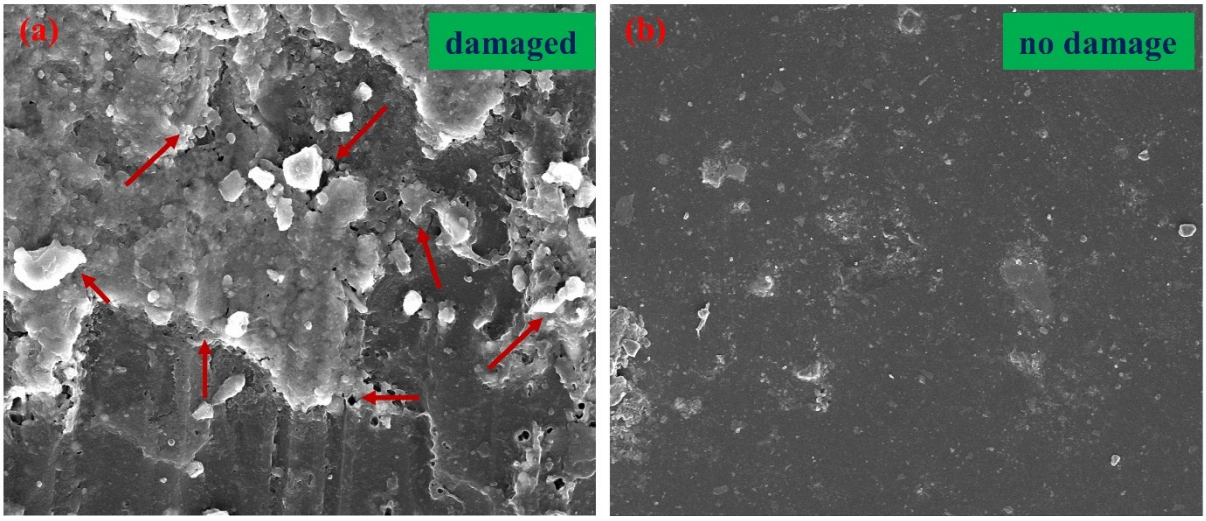

Fig. S4. SEM micrograph of CS coated (a) alk-Pl(b) alk-DDS-PPy-PSCeO_2-1.5 after salt mist exposure.

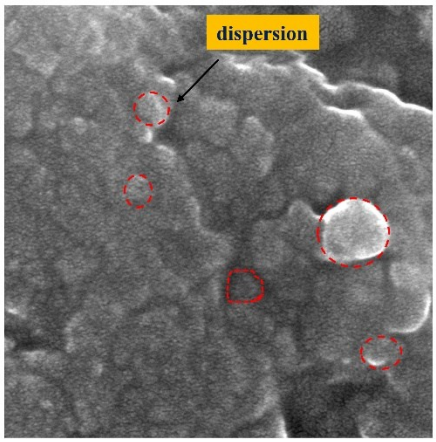

Fig S4b``. SEM image exhibiting dispersion of hybrid nanofillers inside the alk-DDS-PPy-PSCeO_2-x (0.5-1.5) matrix.

Table S1. Comparison of corrosion protection performance of Alk-DDS-PPyPSCeO_2 nanocomposite with other reported systems

Coating systems	I_{corr}	E_{corr}	Corrosion rate	Medium	Reference
alkyd@lanthanide bis-phthalocyanine nanocomposite	1.40×10^{-6}	0.253	92.6	0.5 M HCl	45
Acrylic-silicone modified alkyd	7.03×10^{-7}	0.11	99.36%	3.5 wt% NaCl	46
Clay-nanotube filled with green corrosion inhibitor	2.1	-0.73		3.5 wt% NaCl	47
PDA-PANI-GO composite	3.70	−299	95.88	3.5 wt% NaCl	48

Nano iron-oxide alkyd	0.00008365	-598.5	96%	3.5 wt% NaCl	49
Alk-DDS-PPy-$PSCeO_2$	3.0×10^{-1}	0.35	98.5	1.5 M NaCl	Present system

Table S2. Physico-chemical properties of TMG, alk-DDS and alk-DDS-PPy-$PSCeO_2$-x

Resin type	Specific gravity (g/mL at 25^{O}C)	Refractive index(25^{O}C)	Acid value (mg KOH/g)
TMG	1.04	1.48	0.03
Alk-DDS	1.12	1.53	0.02
alk-DDS-PPy-$PSCeO_2$-1.5	1.22	1.55	0.01

Table S3. Physico-Mechanical Tests of different alkyd coatings

Resin code	Alk-Pl	Alk-0.5	Alk-1	Alk-1.5
Gloss (45^{o})	60^{o}	72^{o}	81^{o}	86^{o}
DTT (dry to touch, hr)	0.55	0.45	0.42	0.33
DTH (dry to hard)	60	55	49	45
Scratch hardness (kg)	5	8	11.5	12.5

Impact resistance (lb/inch)	failed	passed	passed	passed
Bend test (1/8``)	passed	passed	passed	passed
Cross hatch test	Failed	passed	passed	passed

Table S4. Electrochemical reactions occurring at anode and cathode

At anode	At cathode
$Fe \rightarrow Fe^{3+} + 3e^-$	$2H_2O + O_2 + 4e^- \rightarrow 4OH^-$
	$PPy_{(doped)} + ne^- \rightarrow PPy_{(undoped)}$
	$PPy + n/4\ O_2 + nH^+ \rightarrow PPyn^+ + n/4H_2O$
	$Fe^{3+} + CeO_2 \rightarrow Fe_xCeO_y$