Electronic Supplementary Material (ESI) for Journal of Materials Chemistry C.

Online Supporting Information's for

Highly stable Rhenium Organosol on DNA Scaffold for Catalytic and SERS Applications

K. Sakthikumar, S. Anantharaj, Sivasankara Rao Ede, K. Karthick and Subrata Kundu*

Electrochemical Materials Science (ECMS) Division, CSIR-Central Electrochemical Research Institute (CECRI), Karaikudi-630006, Tamilnadu, INDIA.

* To whom correspondence should be addressed, *E-mail:* skundu@cecri.res.in *and* subrata_kundu2004@yahoo.co.in, Fax: +91 4565-227651; Tel: +91 4565-241487.

Instruments.

The synthesized Re organosol was characterized using various spectroscopic and microscopic techniques such as UV-Visible, HR-TEM, XRD, EDS, XPS, Laser Raman and FT-IR analyses. The UV-Visible (UV-Vis) absorption spectra were recorded in a Unico (model 4802) UV-Vis-NIR spectrophotometer equipped with a 1 cm quartz cuvette holder for liquid samples. The high-resolution transmission electron microscopy (HR-TEM) analysis was done with a Tecnai model TEM instrument (Tecnai^{TM} G2 F20, FEI) with an accelerating voltage of 200 KV. The Energy Dispersive X-ray Spectroscopy (EDS) analysis was done with the Field Emission Scanning Electron Microscopy (FE-SEM) instrument (Zeiss ultra FE-SEM instruments) with a separate EDS detector (INCA) connected to that instrument. The X-ray diffraction (XRD) analysis was done using a PAN analytical Advanced Bragg-Brentano X-ray powder diffractometer (XRD) with Cu K_α radiation (λ = 0.154 nm) with a scanning rate of 0.020 s^{-1} in the 2θ range 10-90°. The FT-IR analysis was done with the model Nexus 670 (FTIR), Centaurms 10X (Microscope) having spectral Range 4,000 to 400 cm^{-1} with a MCT-B detector. The LASER Raman measurements were carried out with the green emitting semiconductor laser source of 540 nm. The excitation light intensity in front of the objective was ~10 mW with a spectral collection time of 1 sec for Raman experiment. The integration time for our measurement was set to 10 sec.

Preparation of samples for various other characterizations.

The synthesized Re organosol on DNA scaffolds were characterized using UV-Vis, TEM, EDS, XRD, XPS, Laser Raman and FT-IR studies. The as-synthesized Re organosol were diluted (as required), drop casted over carbon coated copper grids, dried in air and finally analyzed with TEM instrument. For UV-Vis spectroscopic analysis the as-synthesized Re organosol was used directly. For FT-IR analysis, 10 μL of Re organosol was mixed with KBr, the reaction mixture was palletized and analyzed immediately with FT-IR instrument. For XRD, EDS and XPS analysis, a thin film was prepared by repeatedly pouring 150 μL of Re organosol over glass slide and by drying at room temperature. The process is repeated for more than 15 times. The dried thin film was used for analysis. The preparation of sample for catalysis and for SERS studies was described in main MS under experimental section.

Table S1: The FT-IR bands experimentally observed in our used DNA and the reported value with corresponding band assignment are given.

FT-IR bands - de-oxyribo nucleic acid (DNA)-Experimental and Reported values		
FT-IR bands (cm^{-1}) (experimentally observed in acetonitrile)	**FT-IR frequency range (cm^{-1}) (reported value)[44]**	**Absorbing bonds/vibration types**
3445	3100-3750	ν (OH group in DNA/water)
2944	2800-2950	Symmetric stretching vibration (C-H bonds in $–CH_2$ group)
1628, 1714	1732-1595	C=O, C-N, N-H
1429, 1563	1570-1480	Bending (δ) of C-H bond in CH_2
1280	1170-1300	Asymmetric stretching of PO_2^- group
1041, 1127	1140-990	ν (C-O-C, C-C)
659, 803, 925	600-1000	De-oxyribose region

Reference 44 is shown here is given in main MS.

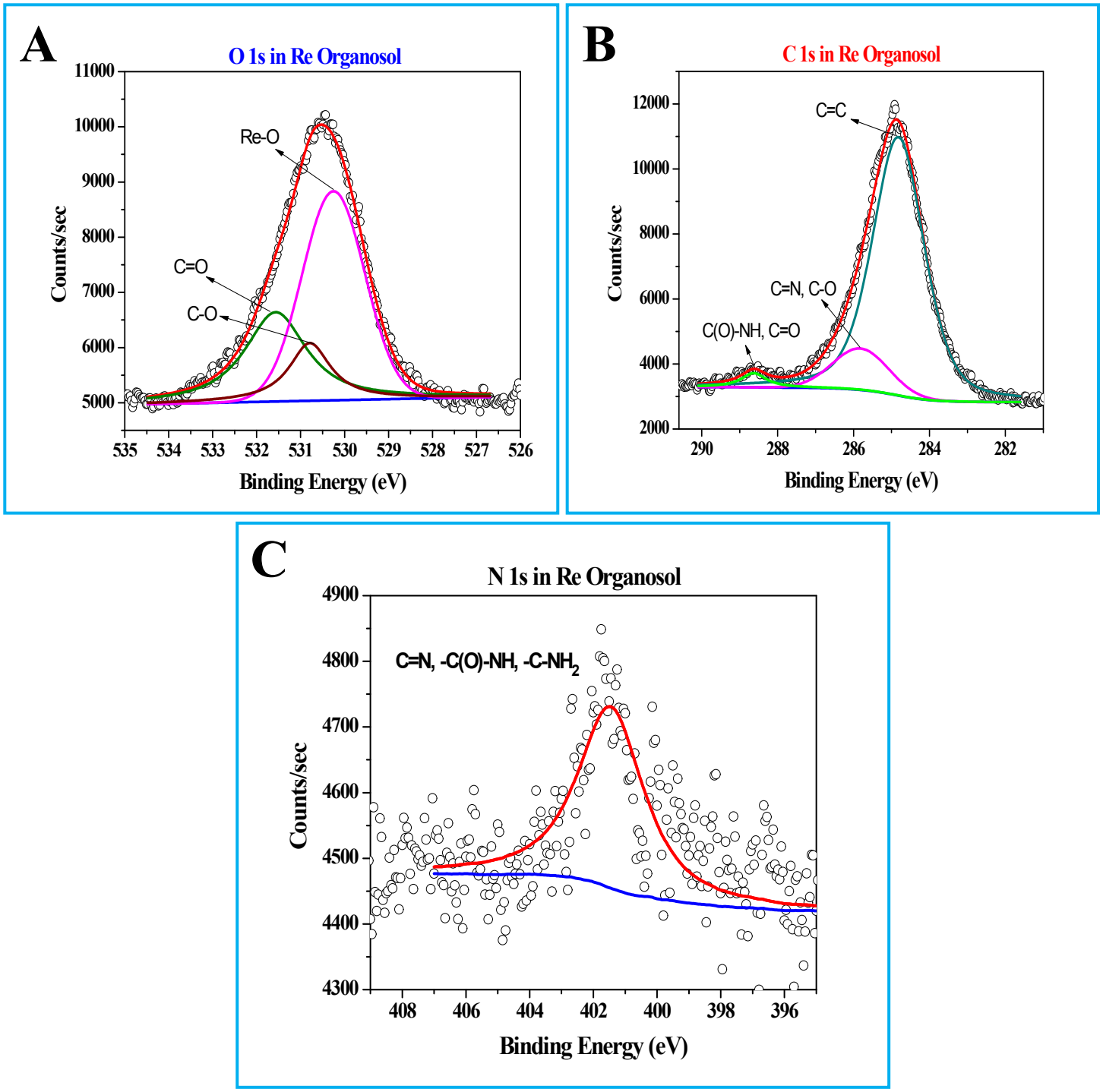

Figure S1: A-C show the high resolution XPS spectra for O 1s, C 1s and N 1s respectively.