

Figure S1: Capacitance vs log frequency curve recorded for gold in (a): ethanol + 0.1 M LiClO_4 solution, (b): ethanol + 0.1 M LiClO_4 + 20 μM RSH solution, (c): ethanol + 0.1 M LiClO_4 + 20 μM $\text{R}(\text{SH})_2$ solution, (d): ethanol + 0.1 M LiClO_4 + 20 μM RS_2H solution, (e): ethanol + 0.1 M LiClO_4 + 20 μM RSSR solution, (f): ethanol + 0.1 M LiClO_4 + 20 μM RSeSeR solution. Constant capacitance plateau is shown in each figure.

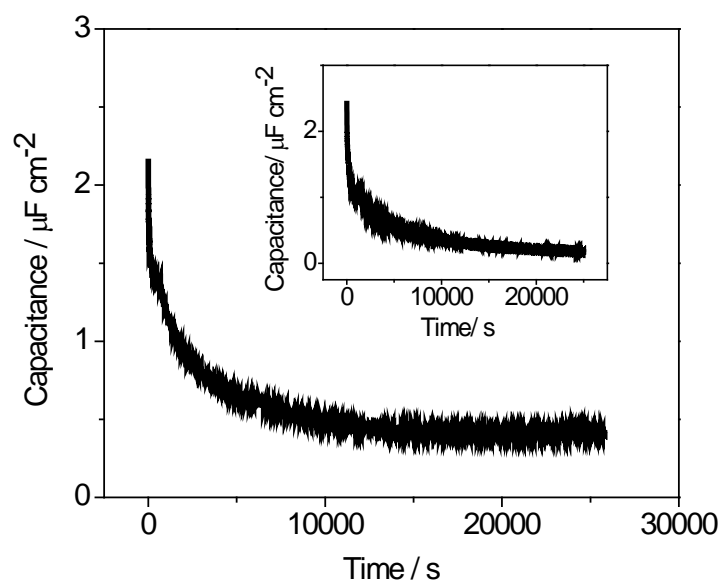


Figure S2: Capacitance vs time curve in 5 mM RS_2H solution recorded under Ar atmosphere for the Cu which was subjected to oxidation in air after its electro-reduction under Ar atmosphere. Inset shows the capacitance vs time curve in 5 mM RS_2H solution for the Cu which was electro-reduced and studied under Ar atmosphere without exposure to atmospheric air at any time. Solvent: ethanol, supporting electrolyte: 0.1 M LiClO_4 .

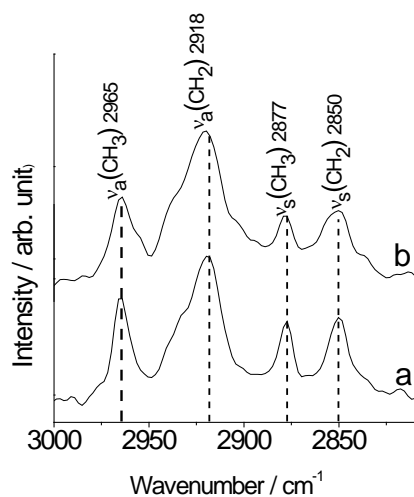


Figure S3. PM-IRRAS spectra recorded for the monolayers derived from RSSR (a), RSeSeR (b) on Au. The spectra were recorded for the monolayers prepared for 7 hours from 1 mM solution.

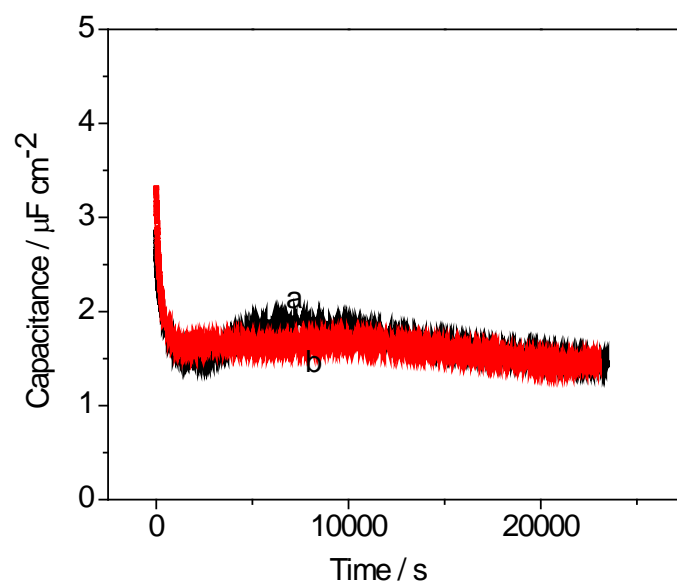


Figure S4: Capacitance vs time curves in 5 mM RSeSeR solution recorded for the Cu which was subjected to oxidation in air after its electro-reduction under Ar atmosphere (a) and for the Cu which was electro-reduced and studied under Ar atmosphere without exposure to atmospheric air at any time (b). Solvent: ethanol, supporting electrolyte: 0.1 M LiClO₄.

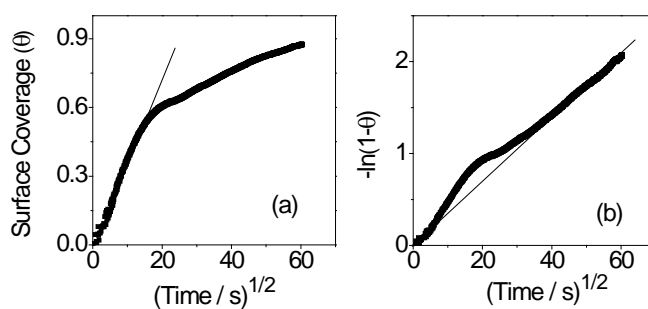


Figure S5. The kinetic fittings for the adsorption from 0.1 μM RSH solution. The initial adsorption follows diffusion controlled kinetics or diffusion controlled Langmuir model. Thereafter adsorption does not follow any of the studied kinetic models for a time interval corresponding to the intermediate capacitance stage. Thereafter, adsorption follows diffusion limited Langmuir model.

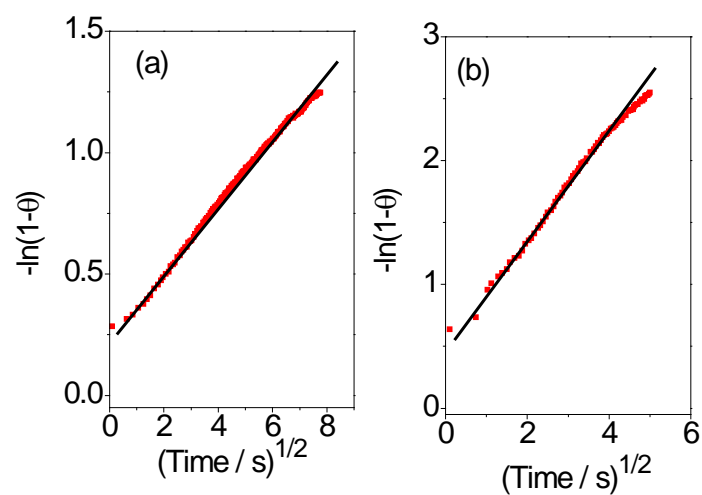


Figure S6. The kinetic fittings for the adsorption from 10 (a) and 20 μM (b) RSSR solutions.

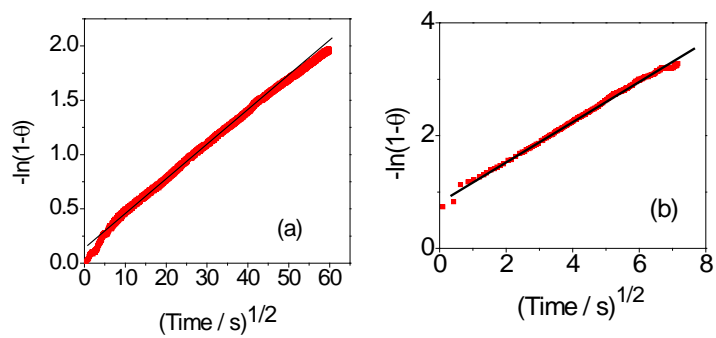


Figure S7. Fitting with diffusion controlled Langmuir model for the adsorption on Au from 0.1 μM RSeSeR solution (a) and 20 μM RSeSeR solution (b).