Reconstituting Enzymes for Direct Electron Transfer through Surface Initiated Polymerization of Conjugated Polymers

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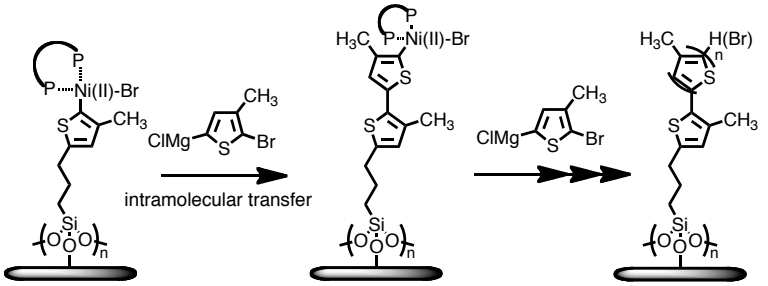
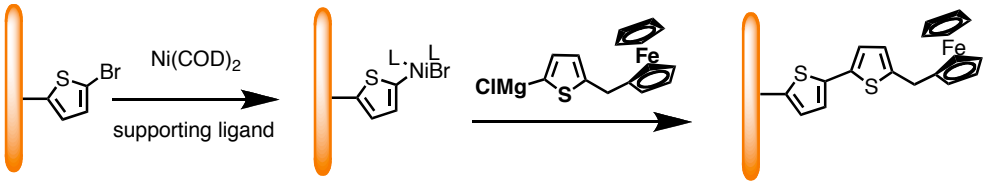
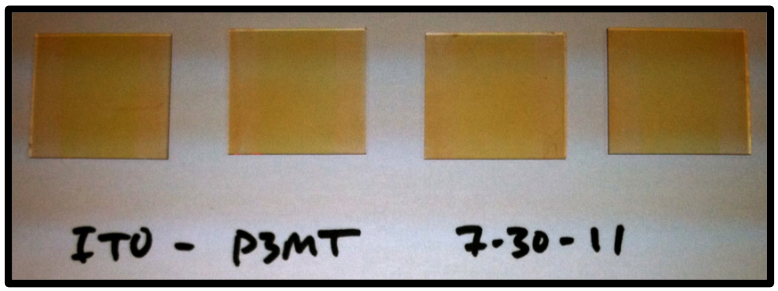
We have made significant advances in the surface-initiated polymerization of conjugated polymers using a Kumada-type catalyst transfer polycondensation. Both substituted and unsubstituted poly(thiophenes) and poly(p-phenylenes) have been synthesized from aromatic bromide monolayers on gold and ITO using both Ni and Pd cross-coupling.

Schematic of the surface initiated polymerization process







We have determined the catalyst density on surfaces indirectly through monolayer coupling experiments with defined redox couple

Ligand	Coverage (10^{13} molecules/cm^2)	Yield (%)	FWHM (mV)	$E_{1/2}$ (V *vs.* SCE)
2 equiv. PPh_3	6.00	10	120	.43
dppe	4.84	8.1	116	.43
dppp	4.14	6.9	122	.41
bpy	5.16	8.6	95	.39