Electrochemically-Controlled Alkene Binding Affinity of Surface-Immobilized Metal-Thiolate Complexes

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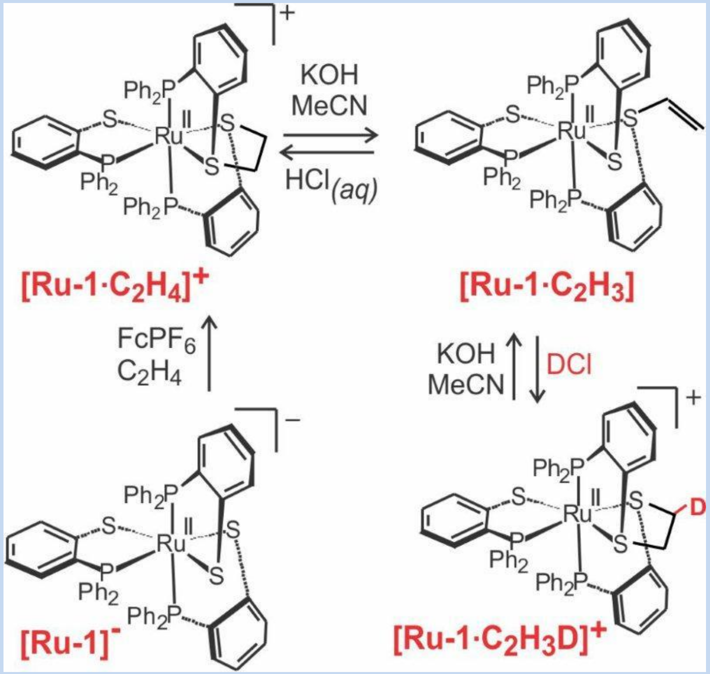
Deprotonation of **[Ru-1·C_2H_4]$^+$** with potassium hydroxide yields the vinyl metallosulfonium derivative **[Ru-1·C_2H_3]** in acetonitrile via an elimination reaction. Acidification of **[Ru-1·C_2H_3]** with HCl or HBr regenerates **[Ru-1·C_2H_4]$^+$**. The reversible deprotonation proceeds selectively at the carbon alpha to the sulfur trans to phosphorus. Deuteration of **[Ru-1·C_2H_3]** with DCl yields the mono-deuterated dithioether complex **[Ru-1·C_2H_3D]$^+$**, which yields the deuterium free product **[Ru-1·C_2H_3]** upon deprotonation. We look to exploit this for selective deuteration of alkenes in the future.



A film of **[Re-1]$^+$** drop-coated across gold electrodes exhibits an increase in resistance upon exposure to ethylene. This is due to selective ethylene binding to form **[Re-1·C_2H_4]$^+$**, which exhibits higher resistance due to less electron delocalization in the metal-thiolate complex. The binding is reversible, leading to release of ethylene in the presence of nitrogen and a return to the original resistance.