

A molybdenum(IV) complex mimics formate dehydrogenase and can convert CO_2 and water to formate (HCOO^-) at $\text{pH} = 7$ using electrons. The lowest oxidation state of Mo in the catalytic cycle is Mo(III). Propose a self-consistent mechanism for the electrochemical reduction of CO_2 to formate by this Mo complex. The ligand of the Mo complex can be omitted. (Note: at $\text{pH} = 7$, formic acid exists as formate.)

Co(II) phthalocyanine is a homogeneous catalyst for electroreduction of CO_2 to form CO . Propose a mechanism for the homogeneous electrocatalysis, and label the oxidation state of Co.

