**Abstract**

**A new mononuclear ruthenium(II) complex, *trans*-[Ru(dmb)2(Cl)(EtOH)](PF6) (dmb = 4,4*'*-dimethyl-2,2*'*-bipyridine), has been prepared and characterized by elemental analysis, spectroscopic techniques (NMR, IR and UV-vis), and single crystal X-ray structure determination. The complex was studied as a precatalyst for the electrocatalytic reduction of CO2 to CO in an acetonitrile solution by cyclic voltammetry (CV). The catalytic mechanism was investigated by means of quantum chemical calculations to gain deeper insight into the process of CO2 reduction. The results suggest that the reaction proceeds in six steps initiating by the two sequential 1ē reductions at the dmb ligands followed by CO2 addition to give a metallocarboxylate intermediate.**