THE ROLES OF HCO_3^-/CO_3^{2-} IN CATALYTIC OXIDATION PROCESSES

Dan Meyerstein

Chemical Sciences Dept., The Radical Research Center and the Schlesinger Family Center for Compact Accelerators, Radiation Sources and Applications, Ariel University, Ariel, Israel, and the Chemistry Dept., Ben-Gurion University, Beer-Sheva, Israel

Bicarbonate/carbonate ions are usually considered only as buffers and proton transfer agents. However recent results point out that they act also as co-catalysts in a variety of oxidation processes. This observation is due to the fact that the redox potential of the couple $CO_3^{\cdot-}/CO_3^{2-}$, 1.57 V, is considerably lower than that of the $OH^{\cdot}/H_2O$ suggests that in many catalytic oxidation processes carbonate might be involved. Furthermore carbonate ligands lower considerably the redox potential of transition metal cations. As a result the carbonate ligand is a non-innocent ligand, *i.e.* a considerable charge transfer from the central cation to the carbonate occurs. The role of bicarbonate/carbonate in catalysing the Fenton and Fenton-Like reactions, in oxidizing $Fe(H_2O)_6^{2+}$ and in homogeneous and heterogeneous water and methanol electrocatalytic oxidation will be discussed.