Electrocatalytic oxidation of ascorbic acid on mesostructured SiO 2 -conducting polymer composites

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Abstract

The conducting self-doping copolymer poly(aniline-co-ABA) preserves its redox activity at pH values as high as 7. This observation was the starting point to synthesize an organic– inorganic hybrid composite able to electrochemically oxidize ascorbic acid molecules at that pH. The inorganic part of the catalytic element was an ordered mesoporous electrode-posit of SiO 2 , which has been used as the template for the electrochemical insertion of the self-doping copolymer. The oxidation of ascorbate ions at a fixed potential on this composite was studied by means of the kinetic model proposed by Bartlett and Wallace (2001). It was observed that the effective kinetic constant K ME increased significantly but, simultaneously , k 0 ME remained almost constant when the composite was employed as the electrocat-alytic substrate. These results were interpreted in the light of two combinations of kinetic constants, which strongly suggested that the increase in K ME should be ascribed to the improvement in electronic conductivity of the copolymer induced by the highly ordered silica template.