Cyclic voltammetric and scanning electrochemical microscopic study of thiolated ?-cyclodextrin adsorbed on a gold electrode

Bollo, Soledad

Yáñez, Claudia

Sturm, Juan

Núñez-Vergara, Luis

Squella, Juan A.

Potassium ferricyanide (Fe(CN)6]3-) reduction and ferrocenemethanol (Fc-OH) oxidation at a ?-cyclodextrin (?-CD)-modified gold electrode were investigated by cyclic voltammetry (CV) and scanning electrochemical microscopy (SECM) in phosphate buffer pH 7. CV and SECM experiments demonstrated that the surface of the modified electrode represents an insulating substrate for ferricyanide and a conductor substrate for Fc-OH. This difference is explained by the fact that Fc-OH can enter into the ?-CD cavity forming an inclusion complex; on the other hand, ferricyanide is larger than the cavity of ?-CD and so it cannot form an inclusion complex. Using the high sensitivity of the electron transfer of ferricyanide to the modification of the gold surface with ?-CD, we selected this reaction as a probe to study the different modification stages at this modified electrode. When the electrode was partially modified, it was possible to obtain an adequate microscopic discrimination by using approach