

Nanocomposites and nanomaterials

Ag nanofoam as electrocatalyst for organic halides reduction

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Electrochemical reduction of organic halides is considered as a promising approach for remediation of halogen-containing organic pollutants in mild conditions, and can also be used in fine organic synthesis. The potentials of such processes strongly depend on electrode material. Nanoscale forms of silver are considered as promising electrode materials for organic halides electroreduction. The aim of this work was to determine characteristics of organic halides electroreduction on silver nanofoam and to compare them with the appropriate characteristics of bulk silver.

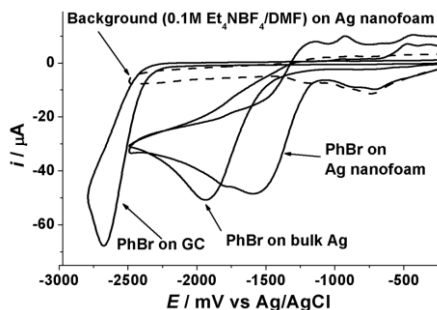


Fig. 1: CVs of bromobenzene in DMF on Ag nanofoam, bulk Ag and GC.

The nanofoam used in this work was obtained as dark grey film by cathodic electrodeposition of silver onto glassy carbon (GC) electrode from $\text{AgBF}_4 + \text{HBF}_4$ aqueous solution under high current density. The specific surface of the film (estimated by cyclic voltammetry (CV) from double layer capacities analysis) was *ca.* 8 times higher compared to bulk Ag. The potentials of CV peaks of organic halides reduction on Ag nanofoam in dimethylformamide (DMF) were more

positive compared to the bulk Ag, the highest shift was 345 mV (bromobenzene, Fig. 1). However, the currents of the peaks on the Ag nanofoam and bulk Ag were comparable. These observations could be explained by formation of active sites on the surface of the nanofoam that promoted the reduction of the organic halides.