

Synthesis of Tungsten Oxide on Copper Powder by Electroless Coating

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Tungsten oxides have interesting electrochromic and photocatalytic properties. Although the low conductivity and large band gap have limited its application in photovoltaic and photocatalytic devices, the efforts to improve its properties by doping metals or by formation of heterojunction with other semiconductors have shown promising. In this work, tungsten oxides were successfully synthesized on copper powder from tungsten-peroxo electrolyte by galvanic displacement. Mesoporous tungsten oxide was also fabricated using SDS as a templating agent. The thickness of tungsten oxide layer was controlled by varying deposition time and the concentration of electrolyte. After synthesis, we performed calcinations at 450°C to increase the crystallinity of tungsten oxide and oxidize copper metal to copper oxide. It was confirmed by XRD, SEM, and TEM analyses that monoclinic structure of tungsten oxide was coated on the surface of copper oxide. The copper oxide was mainly cupric oxide (CuO) with a minor portion of cuprous oxide (Cu₂O). Compared with white tungsten powder, synthesized powder was dark and it absorbed wide range of light (from visible to UV), promising for the photocatalytic applications.