SW-P004

Reduction of Vacuum Sublimation by Ion Beam Treatment for e-beam Deposited SiC Films

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We present the low temperature ($\leq$1,000^{o}C) vacuum sublimation behavior of an e-beam evaporative deposited on a SiC film and a method to reduce the vacuum sublimation through an ion beam process. The density of the SiC film deposited using the e-beam evaporation method was ~60% of the density of the bulk source material. We found that the sublimation became appreciable above ~750^{o}C under 1.5×10^{-5} torr pressure and the sublimation rate increased with an increase in temperature, reaching ~70 nm/h at 950^{o}C when the coated sample was heated for 5 h. When the film was irradiated with 70 keV N+ ions prior to heating, the sublimation rate decreased to ~23 nm/h at a fluence of 1×10^{17} ions/cm^{2}. However, a further increase in fluence beyond this value or an extended heating period did not change (decrease or increase) the sublimation rate any further.

Keywords: Vacuum sublimation, e-Beam evaporative deposition, Ion beam

SW-P005

Graphene Based Cu Oxide Nanocomposites for C-N Cross Coupling Reaction

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Copper oxide is a multi-functional material being used in various research areas including catalysis, electrochemical materials, oxidizing agents etc. Among these areas, we have synthesized and utilized graphene based copper oxide nanocomposites (CuOx/Graphene) for the catalytic applications (C-N cross coupling reaction). Briefly, Cu precursors were anchored on the graphite oxide(GO) sheets being exfoliated and oxidized from graphite powder. Two different crystalline structures of Cu2O and CuO on graphene and GO were prepared by annealing them in Ar and O2 environments, respectively. The morphological and electronic structures were systemically investigated using FT-IR, XRD, XPS, XAFS, and TEM. Here, we demonstrate that the catalytic performance was found to depend on oxidative states and morphological structures of CuOx graphene nanocomposites. The relationship between the structure of copper oxides and catalytic efficiency toward C-N cross coupling reaction will be discussed.

Keywords: Copper oxide, graphene