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Interaction of tungsten (W) film with glassy carbon

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Thin film of tungsten (W) was deposited on glassy carbon (GC) substrate using a magnetron sputtering system. The as-deposited samples were annealed under vacuum at temperatures ranging from 600 to 1000 oC for 1hr. The interaction in the interface of W and GC was investigated Rutherford backscattering spectroscopy (RBS) and scanning electron microscopy (SEM). RUMP software was used to simulate the RBS spectra. The thickness of W thin film deposited, atomic composition of deposited layer and the reaction zone (RZ) were deduced from the RUMP results. W-GC interaction became pronounced at annealing temperature from 800 oC and increased progressively up to the highest annealing temperature. The surface morphology of the diffusion couples were examined on SEM. The as-deposited sample possessed a smooth uniform layer of W film while the annealed samples showed a progressive increase in grain size with increased annealing temperature. The atomic composition profile reveals the detailed extent of intermixing and diffusion of the atomic species at the elevated temperatures.

Keywords: tungsten, glassy carbon, interaction, annealing, RBS, RUMP, SEM

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Level for award
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Main supervisor (name and email)
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