

Growth of hexagonal boron nitride on Cu-Ni alloys

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While growing h-BN on polycrystalline Cu using chemical vapor deposition is of great interest and has been successfully demonstrated. The ability to control the thickness of h-BN films is severely limited due to the self-limiting catalytic nature of Cu substrates. Therefore, there is a search for newer, evolutionary substrates to grow single to multilayer thick h-BN films.

In this work, we will showcase some of our findings on the growth of hexagonal boron nitride on Cu, Ni and Cu-Ni alloy substrates. h-BN film growth on Cu-Ni substrate is of great interest as we observe thicker h-BN films with increasing Ni concentration as evident from the FTIR spectra [1]. This gives us a parameter to control h-BN film thickness. We also observe a significant decrease in grain size of the alloy substrate. We will also report some of the simulation results exploring the surface energetics of Cu-Ni alloy.

References

- [1] B. N. Feigelson, V. M. Bermudez, J. K. Hite, Z. R. Robinson, V. D. Wheeler, K. Sridhara, *et al.*, *Nanoscale*, vol. 7 (2015) 3694-3702

Figures

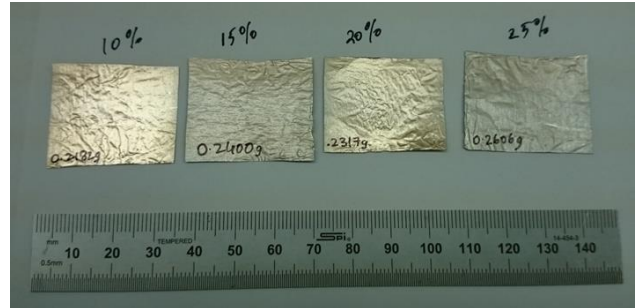


Figure 1: Cu-Ni alloys prepared using Ni electroplating on Cu

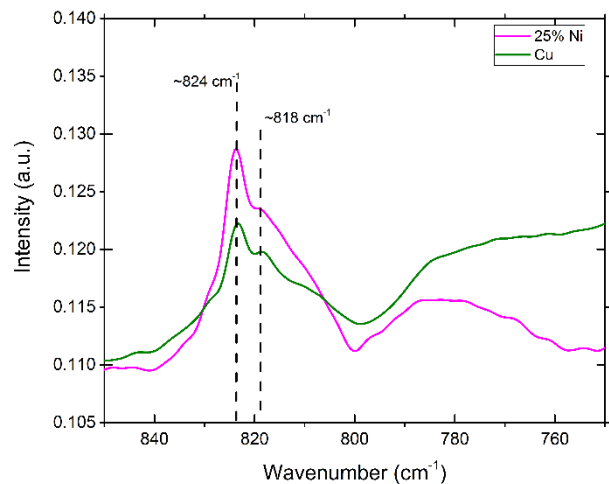


Figure 2: FTIR spectra shows vibrational modes of h-BN on Cu and Cu_{0.75}Ni_{0.25} alloy.