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EFFECT OF ANNEALING TEMPERATURE AND GAS FLOW RATE ON THE THERMAL PERFORMANCE OF AlNB ALLOY AS A SOLID THERMAL INTERFACE MATERIAL FOR THERMAL MANAGEMENT APPLICATIONS

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ABSTRACT- The AlNB alloy is grown on aluminium alloy substrates (5052) in a thickness ratio of (8:2) for AlN:B using reactive sputtering at room temperature and annealed at three different temperatures of 200°C, 300°C and 400°C respectively, the (Ar:N_2) ratios were varried through 40:60%, 50:50%, 60:40% and 80:20% to establish a better ratio for the growth of the material. High resolutin X-ray diffractometer (XRD), atomic force microscopy (AFM), field emission scanning electron microscopy (FESEM) and Fourier-transform infrared spectrometer (FTIR) were used to discuss structurs, topological, morphological and molecular structures of the grown materials withe their respective variations. On the other hand, the thermal performance based on the grown materail`s thermal resistance from junction to ambient with high power light emeitting doide (LED) attached to it through the substrate were established to to show the best performing growth based on the annealing temoeratures and gas ratios. The material grown based on the (12:8) gas ratio at 400°C is observed to perform better than other materials grown together with different parameters. The material is believed to be a good candidate for thermal managenet of LED and other solid state devices.

Keywords: AlNB alloy, Gas ratio, Annealing temperature, Thin film, Thermal management.