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Determination of electron penetration depth and stopping power of amorphous AlN using luminescence of Tm and Ho ions MUHAMMAD MAQBOOL, Mount Olive College, MARTIN KORDESCH, Ohio University — Electron penetration depth and stopping power of amorphous AlN is determined using luminescence of Tm^{+3} and Ho^{+3} ions. Thin film bilayers of AlN:Ho and AlN:Tm are deposited on flat Silicon substrates by RF Magnetron sputtering at liquid nitrogen temperatures. In making a bilayer, 15.3 nm thick AlN:Ho film is first deposited on a flat Si(111) substrate of 2×2 cm^2 surface area. On the top of this AlN:Ho film 37.8 nm thick AlN:Tm film is deposited to make it a bilayer. Electron beam of different energies, obtained from electron gun of the CL apparatus, is allowed to penetrate in the AlN:Tm/AlN:Ho bilayer film. Blue emission from Tm^{+3} as a result from $^1D_2 \rightarrow {}^3F_4$ transition and green emission from Ho^{+3} as a result from $^5S_2 \rightarrow {}^5I_8$ transition were used to track the electron beam penetrating in the bilayer. Energy of the beam just crossing 37.8 nm AlN:Tm film is recorded to obtain the stopping power experimentally. Experimental results are compared to the theoretical value using the established mathematical equations for stopping power. A percent deviation of 6.6% is found in the experimental and theoretical results.

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