

MECHANICAL AND TRIBOLOGICAL PROPERTIES OF THE 100 NM THICK Al_2O_3 FILMS PREPARED BY ATOMIC LAYER DEPOSITION ON Si (100) SUBSTRATES

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Study investigates the mechanical and tribological properties of Al_2O_3 (alumina) films prepared on the Si(100) substrates. The 100 nm thick films were deposited by atomic layer deposition (ALD) [1]. Nanoindentation and nano-scratch tests were performed with Berkovich and sphero-conical diamond indenters, respectively. Energy-dispersive X-ray spectroscopy (EDS), optical and scanning electron microscopy (SEM) were used to analyze thin films surface morphology and chemical composition. X-ray diffraction (XRD) was used to characterize thin films crystal structure, it was found that the crystallization starts at 1100 °C after 3 hours of annealing [2]. The hardness and tribological properties of alumina films were influenced by substrate in nanoindentation and nano-scratch tests. Within the relatively low load range (5–50 mN), the coefficient of friction (COF) of Si and alumina against diamond depends on load due to likely a change in elastic/plastic deformation behavior within the Si substrate as illustrated in (Fig.1).

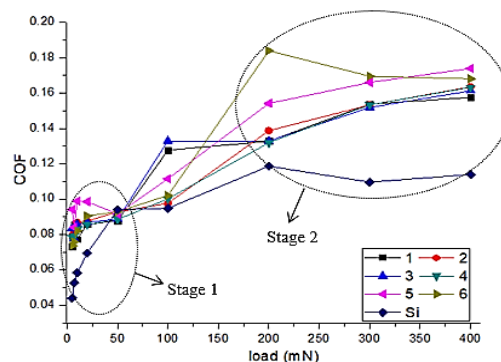


Fig.1 COF versus load curves

References

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