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Effects of 1 keV Ar⁺ ion bombardment on Au films on Glass

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Au films with a thickness around 1500 Å were deposited on glass at room temperature by sputtering method with a 5 cm cold-hollow ion gun at pressure of 1×10^{-6} - 1×10^{-5} Torr. Sputtering of the Au deposited samples was carried by a cold-hollow ion gun in the vacuum chamber maintaining about 1×10^{-5} Torr. For the sputter depositions, Ar⁺ ion energy was 1 keV, and the current density at the substrate surface was 15 $\mu\text{A}/\text{cm}^2$. Effects of 1 keV Ar⁺ ion dose (I_d) between 0 and 2×10^{17} Ar⁺ / cm^2 on such properties as crystallinity, surface roughness, adhesion, etc. of the films have been investigated. The Au films sputtered by Ar⁺ ion beam had only (111) plane and the intensity of the films decreased with increase of I_d . The thickness of Au films reduced with I_d . Surface roughness of the films increased from 16 Å at as-deposited 118 Å at 2×10^{17} Ar⁺ / cm^2 . Adhesion of Au film on glass sputtered at $I_d = 2 \times 10^{17}$ Ar⁺ / cm^2 was 9 times greater than that of Au film with untreated, as determined by a scratch test.