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Alkali ion scattering from sputter-induced Au nanoclusters P. KARMAKAR, G.F. LIU, Department of Physics, University of California, Riverside, California 92521, Z. SROUBEK, Institute of Radio Engineering and Electronics, Czech Academy of Science, Chaberska 57, 182 51, Prague 8, Czech Republic, J.A. YARMOFF, Department of Physics, University of California, Riverside, California 92521 — The neutralization of scattered 3 keV $^{23}Na^+$ ions is used to probe the confined states of sputter induced Au nanoclusters on a $TiO_2(110)$ substrate. The neutral fraction of Na scattered from Au nanoclusters deposited on $TiO_2(110)$ is high compared to bulk Au, as described earlier (G.F. Liu, Z. Sroubek, J.A. Yarmoff, Phys. Rev. Lett. **92**, 216801 (2004)). Here, normal incidence 0.5 keV Ar^+ ion bombardment of a thin Au film is employed as an alternative method for the self-organized formation of Au nanoclusters. The interplay between curvature dependent sputtering and surface diffusion during Ar^+ bombardment works to develop the Au nanoclusters. The neutral fraction of the scattered Na gradually increases from 5% to 50% as the cluster dimensions decrease due to the Ar^+ sputtering. XPS is used to quantify the reduction of Au coverage with sputtering time. STM revels a decrease of both the rms roughness and the correlation length of Au nanoclusters with Ar^+ fluence.

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