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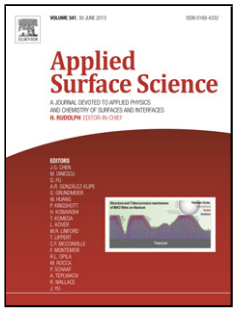

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Electronic structure of Ar^+ ion-sputtered thin-film MoS_2: a XPS and IPES study

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Keywords: MoS_2; sulphurization; CZTS; Ar^+ ion sputtering; XPS; inverse photoemission.

Abstract

Polycrystalline MoS_2 grown by Mo sulphurization was exposed to increasing doses of Ar^+ ions at 250eV starting from 2.2 x 10^{15} ions/cm^2 to 3.92 x 10^{17} ions/cm^2. Electronic structure changes were monitored by X-Ray Photoelectron Spectroscopy (XPS) and Inverse Photolectron Spectroscopy (IPES). No change in the Fermi level position was observed with Ar^+ dosing. Ion bombardment resulted in a new visible feature at lower binding energy in the Mo3d core level, while the S2p lineshape showed little changes. The formation of a steady state from 2.49 x 10^{17} ions/cm^2 has been detected. The investigation of the occupied and unoccupied states on the steady-state surface pointed to the simultaneous presence of metallic-like Mo with amorphous MoS_{2-x}.

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