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ABSTRACT

2D Material as Arsenene 3D Material as $CsSbBr_3$ Perovskite

Paola De Padova

Consiglio Nazionale delle Ricerche-ISM, Via Fosso del Cavaliere 100,
00133 Roma, Italy

Two dimensional (2D) arsenene, a new allotropic form of arsenene with $\sqrt{3} \times \sqrt{3}$ *R*30° reconstruction, exhibiting electronic structure with metallic character, has been revealed on single crystal Ag(111)1 × 1 at temperature of ~ 450 °C, whereas the 2D arsenene with 5 × 5 reconstruction, produces its appearance at a significantly lower temperature of ~ 350 °C. Interesting enough, it was discovered a reversible structural phase transition between these two surface reconstructions, under applying temperature, and/or electron gun irradiation, as established by Auger electron spectroscopy (AES), electron energy diffraction (LEED), and first-principle calculations, by using density functional theory, explicating both atomic structures and their associated band dispersions (ARPES) [1].

Furthermore, staying within the realm of 2D materials, the evidence of sp^2-like hybridization of silicon valence orbitals in thin-and-thick Si grown on α-phase Si(111)$\sqrt{3} \times \sqrt{3}$ *R*30° Bi [2] was, recently, achieved. Instead, just 2D Si(111) islands, on β-phase Si(111)$\sqrt{3} \times \sqrt{3}$R30°-Bi interface [3] were accomplished. However, moving towards extremely ordered 3D materials, the role of SiO_2 buffer layer in the molecular beam epitaxy growth of $CsPbBr_3$ perovskite on Si(111), will be also presented [4, 5].

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[4] P. De Padova, et al., Scientific Reports | (2024) 14:23618.
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