19th INTERNATIONAL CONFERENCE ON DIFFUSION IN SOLIDS AND LIQUIDS
DSL2023
HERAKLION, CRETE | GREECE
26-30 JUNE 2023

ABSTRACT:

Formation and Protection Properties of a 2D Hexagonal Boron Nitride Layer on Vicinal Substrates

One of the fundamental applications for monolayer-thick 2D materials is their use as protective layers of metal surfaces and in-situ intercalated reactive materials in ambient conditions. Here we investigate the structural, electronic, and magnetic properties, as well as the chemical stability in air of a very reactive metal, Europium, after intercalation between a hexagonal boron nitride (hBN) layer and a Pt substrate. We demonstrate that Eu intercalation leads to a hBN-protected ferromagnetic EuPt2 surface alloy with divalent Eu2+ atoms. We expose the system to ambient conditions and find a partial shielding of the Eu-Pt interface, which remains ferromagnetic. The use of a curved Pt substrate allows us to explore ferromagnetism and the ambient pressure protection with different substrate planes. The interfacial EuPt2 surface alloy formation remains the same, but the resistance of the protecting hBN layer to ambient conditions is reduced, likely due to a rougher surface and a more discontinuous hBN coating. In the last part we will explore such protection to different substrate materials, Ir and Rh