

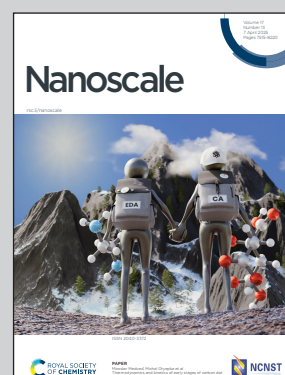
Showcasing research from Professor Seth A. Tongay's group,  
School for Engineering of Matter, Transport and Energy, Arizona  
State University, Tempe, Arizona, USA.

Metallic 2D Janus SNbSe layers driven by a structural phase change

This study presents the synthesis of SNbSe and SeNbS 2D metallic Janus layers from monolayer NbS<sub>2</sub> and NbSe<sub>2</sub> using a room-temperature plasma-assisted technique. The results reveal the 1H-to-1T structural phase transition driving Janus layer formation. Comprehensive spectroscopy and Z-contrast STEM imaging uncover the phononic and structural properties of the Janus layers, along with their environmental and energetic stability. Density functional theory (DFT) simulations provide additional insights into phononic and electronic properties, highlighting their potential for various applications. Overall, this work demonstrates the realization of niobium-based Janus metals and expands the library of metallic Janus layers.

Image reproduced by permission of Cheng-Lun Wu from *Nanoscale*, 2025, **17**, 7801.

As featured in:



See Seth A. Tongay *et al.*, *Nanoscale*, 2025, **17**, 7801.