Wafer-Scale Anti-Ambipolar Heterojunctions

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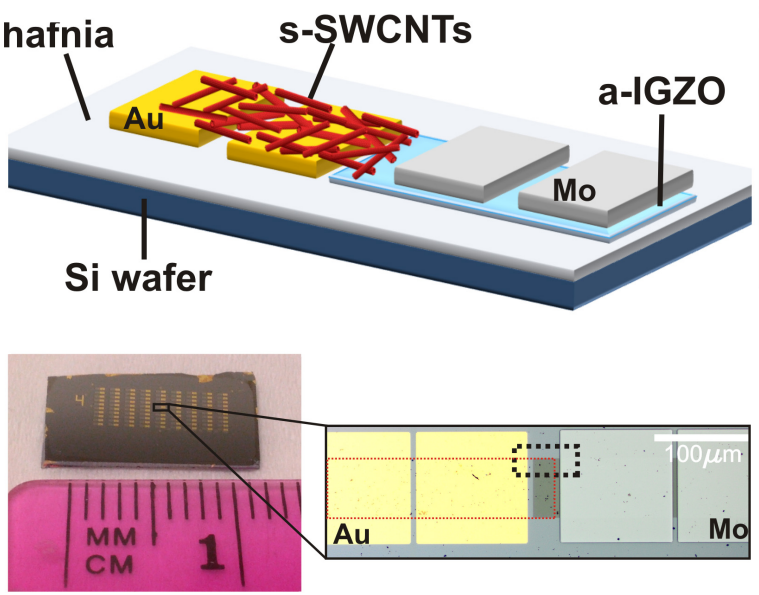
The emergence of semiconducting materials with inert or dangling bond-free surfaces has created opportunities to form van der Waals heterostructures without the constraints of traditional epitaxial growth. In an NU-MRSEC collaboration involving IRG1 and IRG2, the concept of the van der Waals heterojunction has been extended to semiconducting p-type single-walled carbon nanotubes (s-SWCNTs) and n-type amorphous indium gallium zinc oxide (a-IGZO) thin films that can be solution-processed at the wafer scale. The resulting large-area, low-voltage p-n heterojunctions exhibit anti-ambipolar transfer characteristics with high on/off ratios that are well-suited for electronic, optoelectronic, and telecommunication technologies.



Anti-ambipolar p-n heterojunctions are fabricated at the wafer-scale using s-SWCNTs and a-IGZO.

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