

Transport Properties of Superconductor-Ferromagnetic-Semiconductor Heterostructures

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The rising interest in superconducting quantum computation has led to the exploration of topological superconductors. One of the schemes to achieve a topological superconductor is to use hybrid superconductor-semiconductor structures [1]. We are studying MBE grown InAs surface 2DEGs coupled with Al as a potential candidate. In addition to the good epitaxial contacts, spin texture of the induced current governs the nature of superconductivity. Using dilute magnetic semiconductors $\text{In}_x\text{Mn}_{1-x}\text{As}$, we can filter the triplet states over the singlets. The Al-InAs heterostructures have been characterized and studied using Josephson junctions. We also report on structural analysis of MBE epitaxy of Al-InMnAs-InAs and corresponding magnetic and electronic measurements.

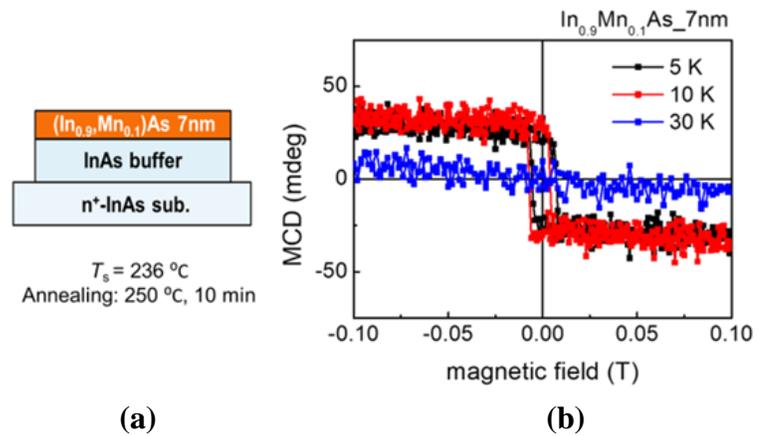


Fig 1. (a) Growth of InMNAs on InAs. (b) Shows pristine quality of the ferromagnetic ordering with Curie temperature below 30K.

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