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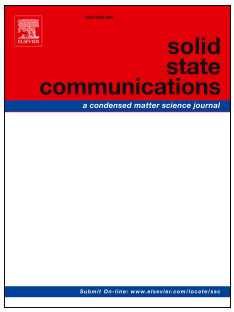

Properties and superconductivity in Ti-doped $NiTe_2$ single crystals

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Properties and superconductivity in Ti-doped $NiTe_2$ single crystals

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ABSTRACT

Transition metal dichalcogenides (TMDs) usually show simple structures, however, with interesting properties. Recently some TMDs have been pointed out as type-II Dirac semimetals. In the present work, we investigate the physical properties of a new candidate for type-II Dirac semimetal and investigate the effect of titanium doping on physical properties of Ti-doped single crystalline samples of $NiTe_2$. It was found that this compound shows superconducting properties with a critical temperature close to 4.0 K. Interestingly, applied pressures up to 1.3 GPa have no effect upon the superconducting state. Density Functional Theory (DFT) calculations demonstrate the presence of a Dirac cone in the band structure of $NiTe_2$ literature when Spin-Orbit Coupling (SOC) is included, which is in agreement with a recent report for this compound. Also, our calculations demonstrate that Ti suppresses the formation of these non-trivial states.

Keywords: A. Superconductors; B. Crystal Growth; D. Electronic Band Structure