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Large magnetoresistance induced by crystallographic defects in Fe_xTaS_2 single crystals[1] CHIH-WEI CHEN, EMILIA MOROSAN, Rice University, MOROSAN'S GROUP TEAM — The search for the materials that show large magnetoresistance and the mechanisms that induce it remains challenging in both experimental and theoretical aspects. The giant magnetoresistance in one class of materials, ferromagnetic conductors, is generally attributed to the misalignments of magnetic moments, which cause spin disorder scattering. Recently, very large magnetoresistance (>60%) was discovered in the ferromagnetic Fe-intercalated transition metal dichalcogenide, $Fe_{0.28}TaS_2$ [Phys. Rev. B 91, 054426(2015)]. The mechanism that led to this large magnetoresistance was suggested to be due to the deviation of Fe concentration from commensurate values (1/4 or 1/3), which caused magnetic moments misalignments. Here we report a study of Fe_xTaS_2 crystals with x close to the commensurate values. Our results qualitatively demonstrate that crystallographic defects significantly affect magnetoresistance in Fe_xTaS_2. This provides a way to search for large magnetoresistance in more intercalated transition metal dichalcogenides.

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