Title:	Single Crystal Growth and Transport Properties of RCrSb3 (R= La, Ce, Nd)
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Abstract:	Topological semimetals are new classes of quantum materials, which are characterized by surface states induced by the topology of the bulk band structure. So, we plan to grow some materials which may or may not be Weyl or Dirac semimetals but shows features similar to them, i.e., high transport properties, quantum anomalies which may be further beneficial for many other applications. In this thesis, I have used Flux method for single crystal growth from solid state reaction as my primary step to move towards the materials. The RX (R = Ce, Pr, Sm; X=Sb, Bi) family of materials display a very large magnetoresistance, and non-trivial band topologies and SmSb is antiferromagnetic semimetal. We characterize the single crystal of SmSb with the help of EDX, XRD, and orient properly with the help of Laue diffraction. For transport measurements, we cut the rectangular shape of these materials of order 1 × 1 × 3mm3 . We measured Subhnikov de Hass oscillations very nicely in resistivity which decrease's with angle. Quantum oscillations are generally studied to resolve the electronic structure. To achieve better understanding in term of band structure, we probe Shub nikov–de Haas oscillations in SmSb. A quantitative analysis of the SdH oscillations shows that the lowest observed Landau index is 34 in the 9T measurements, the uncertainty as sociated with the fitted intercept is large, indicating that the determination of the Berry phase is not reliable. Also the mass of electron calculated from analysis of fig. 3.4 is 0.40513 me and 0.5513 me for alpha and beta band respectively while Dingle temperature is 2.71K which shows deviation from the ideal temperature at which oscillations shall observe. For a better understanding of the result, we are also collaborated with the theory group to comment further on results.
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