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Growth of single crystals in material research

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The subject of this work was an optimization of the single crystal growth of various materials. Various single crystal growth methods such as Flux, Bridgman, Czochralski, Floating zone and Chemical vapour transport were tested on materials of various classes. The most stressed materials are heavy fermion semiconductors U3T3X4 where T is a transition metal T = Ni, Pd and Pt and X = Sb or Bi as well as Ce3Al11. Other materials discussed in this work are semimetallic material U2Ru2Sn, ferromagnetic superconductor UCoGe doped with Ir, various Sapphire based materials, antifferromagnetic and possible semimetallic material UNiSn and at last known van der Waals ferromagnet VI3. The properties and parameters of various techniques were tested and optimized for achieving the highest possible quality of single crystals.

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