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Growth and Properties of Skyrmionic MnSi Nanowires and Thin Film on Silicon ZHENG GAI, Oak Ridge National Laboratory, Oak Ridge, TN, JIEYU YI, SIWEI TANG, University of Tennessee, Knoxville, TN, IVAN.I. KRAVCHENKO, GUIXIN CAO, Oak Ridge National Laboratory, Oak Ridge, TN, DAVID MANDRUS, University of Tennessee, Knoxville, TN, OAK RIDGE NATIONAL LABORATORY, OAK RIDGE, TN COLLABORATION, UNIVERSITY OF TENNESSEE, KNOXVILLE, TN COLLABORATION — Magnetic skyrmion lattice, a vortex-like spin texture recently observed in chiral magnets, is of great interest to future spin-electronic data storage and other information technology applications. The skyrmion lattice in MnSi appears in a small region (known as the A phase) of the H-T phase diagram in bulk samples, but in 2D samples like thin films the skyrmion phase is much more robust. If skyrmion ordering can persist in one-dimensional MnSi nanowires and 2D films, then these systems may be very promising for spintronics applications as the magnetic domains and individual skymions could be manipulated with small currents. We have systematically explored the synthesis of single crystal MnSi nanowires via controlled oxide-assisted chemical vapor deposition and observed a characteristic signature of skyrmion magnetic ordering in MnSi nanowires. The SiO_2layer pla ys a key role for the high yield, correct stoichiometric and crystalline growth of the B20 MnSi nanowires. A growth phase diagram was constructed. For the thin films, an unique growth receipt was developed for the growth of high quality of thin films. The structure and magnetic properties of the films at different thickness were studied.

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