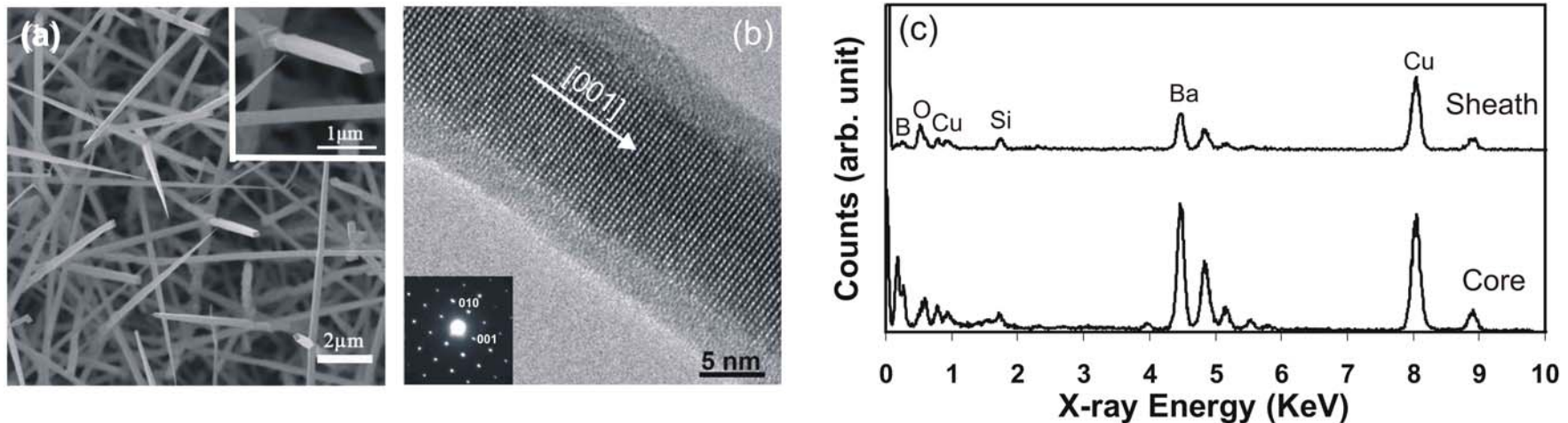


# Novel Boron-based Nanomaterials for Thermoelectric Energy Conversion



Catalyst-assisted growth of  $MB_6$  ( $M=\text{Sr}, \text{Ba}$ ) 1D nanostructures was achieved by pyrolysis of  $B_2H_6$  over alkaline-earth metal oxide (MO) or alkaline-earth metal carbonate ( $MCO_3$ ) powders at elevated temperature ( $\sim 890\text{-}960^\circ\text{C}$ ) and low pressure ( $\sim 165$  mTorr). Ni, Au and Pd are effective catalytic materials. Results show that the  $MB_6$  nanostructures are several tens of nanometer in diameter and up to ten micrometer in length (Fig. a). The  $MB_6$  nanostructures are single crystalline with preferred growth direction along [001] (Fig. b). For most of nanostructures, there is an amorphous oxide layer surrounding the crystalline core structure (Figs. b and c) The growth of these  $MB_6$  nanostructures involved both vapor-liquid-solid and vapor-solid growth mechanisms. The  $MB_6$  1D nanostructures are appealing candidates for high temperature thermoelectric energy conversion.