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Ultrasound-Assisted Synthesis of CuO Nanorods in a Neat Room-Temperature Ionic Liquid

Tarek Alammar,[a] Alexander Birkner,[b] and Anja-Verena Mudring*[a]

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CuO nanorods were prepared via ultrasound-assisted synthesis in the room temperature ionic liquid (RTIL) 1-butyl-3-methylimidazoliumbis(trifluoromethylsulfonyl)imide [C_4mim]-[Tf_2N] as a reaction medium. The structure and morphology of CuO nanorods were characterized with X-ray powder diffraction (XRD), transmission electron microscopy (TEM), energy-dispersive X-ray analysis (EDX), X-ray photoelectron spectroscopy (XPS), vibrational and UV/Vis absorption spectroscopy. The synthesized CuO nanocrystals are of rod like shape with lengths from 30 to 100 nm and diameters of about 10 nm. Quantum size effects were observed as the bandgap of the CuO nanorods was determined to 2.41 eV from UV/Vis absorption measurements, which is significantly larger than the bulk value.