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Analytical Transmission Electron Microscopy for Soft Materials and Organic Crystals at the Center for Nanophase Materials Sciences

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Herein we discuss the capabilities and potentials of a newly acquired Zeiss Libra 120 Energy Filtered TEM (60kV-120kV) at the Center for Nanophase Materials Sciences (CNMS). As part of a user facility offered by the Department of Energy for the scientific community, the Libra 120 at CNMS is optimized for soft materials, including but not limited to block copolymers, organic semiconductors, surfactant covered nanoparticles, biological and bioinspired structures, soft and hybrid assemblies. We will elaborate on the application of analytical TEM and low electron dose techniques in some recent projects, which encompass three-window method for elemental mapping of low atomic-number elements such as sulfur, oxygen and nitrogen, low energy loss imaging, electron energy loss spectroscopy, energy dispersive spectroscopy, low-dose high resolution imaging, and low-dose selected area electron diffraction. We are actively developing cryo-TEM and 3-D tomography capabilities, and are making efforts to combine analytical and low-dose techniques with cryo-TEM in the near future.