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Obtaining an EELS Fingerprint for the Phases of Aluminum Oxide MICHAEL TANNER, Brigham Young University, DAVID CULLEN, Arizona State University, RICHARD VANFLEET, Brigham Young University — The crystal structure of Al_2O_3 is found naturally in a number of different atomic arrangements or phases (more than seven have been confirmed). By heating $Al(OH)_3$ (gibbsite) to different temperature levels in the lab, we obtained the alpha, gamma, and kappa phases which we confirmed by diffraction analysis. We then investigated these samples using electron energy-loss spectroscopy (EELS) in order to obtain an EELS fingerprint for each phase. A unique EELS fingerprint would allow phase identification in nanometer scale regions that cannot be measured by other means. Initial results are promising that the different phases can be differentiated by EELS. Further work will expand these measurements to include all of the phases of Al_2O_3.

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