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Measuring Order and the Debye-Waller Factor for Porous Arrays FORREST KAATZ, Owens Community College, ADHEMAR BULTHEEL, K.U.Leuven Belgium, TAKESHI EGAMI, University of TN — We derive methods that explain how to quantify the amount of order in "ordered" and "highly ordered" porous arrays. Ordered arrays from bee honeycomb and several from the general field of nanoscience are compared. Accurate measures of the order in porous arrays are made using the discrete radial distribution function (RDF) and the Debye-Waller Factor (DWF) from 2-D discrete Fourier transforms calculated from the real-space data using MATLAB routines. Nanoporous anodized aluminum oxide, hexagonal arrays from functional materials, hexagonal arrays from nanosphere lithography, and arrays from block copolymer lithography (all taken from the literature) are compared to two-dimensional model systems. The DWF is normalized to the first harmonic and depends on N, the number of peaks in the fit for these finite arrays. We optimize N to the classical model for the DWF as a fit to reciprocal space $\boldsymbol{K}^2$.

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