Closed Form Equations for X-Ray Diffraction by Interstratified Clay Systems—I: Randomly Occurring Interlamellar Species

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Abstract: A closed form equation is derived for the calculation of the oriented diffraction pattern given by single particle size layer silicates having randomly interstratified interlamellar species. A general method for treating any particle size distribution is indicated and closed form results are presented for the Poisson, normal, gamma and binomial distributions. No restriction is placed on the number of interlayer types. The structure factors for these types are explicitly introduced. Graphs of two of the variables appearing in the equations applicable to particle size distributions provide a means of visualizing the effects of both interstratification and particle size on observed X-ray patterns.

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