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An updated atomic x-ray scattering factor database and calculations accessed via the World Wide Web

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The interaction of x rays with matter by photoabsorption or coherent scattering may be described, away from absorption edges, by the atomic x-ray scattering factors. The forward scattering factors have been determined using the Kramers-Kronig dispersion relations and a synthesis of experimental and theoretical photoabsorption cross sections (see B. L. Henke, E. M. Gullikson, and J. C. Davis, *Atomic Data and Nuclear Data Tables*, Vol. 54, 181-342 (1993)). The latest version of this compilation is now available over the World Wide Web. The atomic scattering factors for the elements $Z=1-92$ in the energy range 30 eV to 30,000 eV are presented along with a collection of programs which utilize the database. The following calculations are presently available: 1) the index of refraction for an arbitrary material; 2) the attenuation length of x rays in a solid versus photon energy or angle; 3) the transmission through a solid or a gas versus energy; 4) the reflectivity of a thick mirror versus energy or angle; 5) the reflectivity of single layer of specified thickness on a substrate versus photon energy or angle. The results of these calculations are presented as either a plot (gif or postscript format) or as a data file. An advantage of this approach is that future revisions can be made available as advancements in experiment or theory occur. The files and calculations may be found under the Center for X-Ray Optics home page at http://www-cxro.lbl.gov/optical_constants/.