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Telling the chiral indices of carbon nanotubes from electron diffraction LU-CHANG QIN, ZEJIAN LIU, Department of Physics and Astronomy, University of North Carolina at Chapel Hill, Chapel Hill, NC 27599 — We report a newly developed one-step method that allows direct reading of the chiral indices [u,v], which specify the perimeter vector of a carbon nanotube, from an electron diffraction pattern of the nanotube. We will present a systematic procedure for the actual use of this method. With the chiral indices of a carbon nanotube determined, its atomic structure such as diameter and helicity and its electronic properties such as being metallic or semiconducting are readily obtained. We have examined a large number of individual single-walled carbon nanotubes to study the distribution of the atomic structure of nanotubes in a sample material produced by arc-discharge. Some selected examples will be presented to illustrate the applications of this method.

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