ratio length/dia. of about 10. In the cigars, the graphitic layers have the shape of an obtuse cone the axis of which is coincident with the axis of the cigar. The cigar is probably formed by a single sheet coiled around the axis in a helix, each turn of the helix having the shape of a cone. The growth mechanism of the cigars probably involves mass transfer through the gas phase.

182. The spectra of longitudinal and transverse dielectric constants of graphite.

S. Ergun and M. Berman (*Pittsburgh Research Center, U.S. Bureau of Mines, Pittsburgh, Pennsylvania*). Longitudinal dielectric constants of graphite[1] are given in the ultraviolet and visible spectrum and they are compared with the transverse dielectric constants. In the infrared region the results of emissivity and reflectance studies are analyzed to determine the extent of optical anisotropy.

1. Ergun S., *Nature* **213,** 135 (1967).

183. Anisotropic crystal growth in thin carbon films.

A. E. B. Presland and J. R. White (*Imperial College of Technology, London, England*). Thin evaporated carbon films have been heat-treated at temperatures up to 2500°C, and the resultant changes in L_a determined from the breadths of the transmission electron diffraction peaks. Isothermally, L_a appears to follow a $t^{\frac{1}{4}}$ law. Electron microscopy of films heated above 2200°C has shown that individual crystallites become markedly anisotropic as they increase in size, developing a length: breadth ratio (in the film plane) as high as 10:1. It has been shown that this anisotropy could account for the scatter in the values of L_a obtained from the diffraction measurements. Linear arrays of crystal defects (thought to be non-basal dislocations) have been observed, which appear to play an important role in the mechanism of graphitization in these films.

184. Method for estimating statistics descriptive of graphite powder mixtures with illustrations of some practical applications.*

H. D. Lewis (*Los Alamos Scientific Laboratory, University of California, Los Alamos, New Mexico*). The purposes of this paper are to: (1) Show proper methods of computing and comparing the statistics defining the "particle size distributions" of mixtures of powders; and (2) demonstrate a quantitative method for evaluating a particle shape factor for both the mixture and the mixture components. The classification of data generated by any particle "size" measuring device into one of two general types is the basis for the development of methods presented for computing statistics for the mixture and an "average" volume shape factor. The definitions of weight ratio $\alpha_{(J)}$ and count ratio $\beta_{(J)}$ (or fractions) for mixtures and conversions $\alpha_{(J)} \leftrightarrow \beta_{(J)}$ required for computation of sample statistics and the volume shape factor are developed for both non-functional and lognormal data models.

* Work performed under the auspices of the United States Atomic Energy Commission.

185. Electronic properties of carbons and graphites.

D. A. Young (*Imperial College of Technology, London, England*). See paper in this issue.

186. X-ray structure of carbons and graphite.

S. Ergun (*Bureau of Mines, Pittsburgh, Pennsylvania*). See paper in this issue.