images (4c). The clear internal canals of the undeformed sample (A) are destroyed; there appear small submicron (100 Å) areas which light up as if they were grains or microdomains of different orientations; consistent with this observation, the strongly textured diffraction patterns of the undeformed fibers (Fig. 3) are changed to those of a polycrystal. At the present the crystallographic and microstructural nature of the deformation is not clear and warrants further study. The effect of translating the aperture to a different part of the diffracted ring is shown in Figs. 4a and 4b. The result is that "grains" in a different orientation "light up" or show diffracted intensity signifying that this is truly a diffraction effect.

To isolate the effects of deformation during the braking process, unused brake shoe burnishing dust (C) was examined (Figs. 5a and 5b). The bright-field image (B) is not informative, whereas the dark-field image clearly shows some intact internal canals (see arrow and arrowhead Fig. 5a) resembling the undeformed

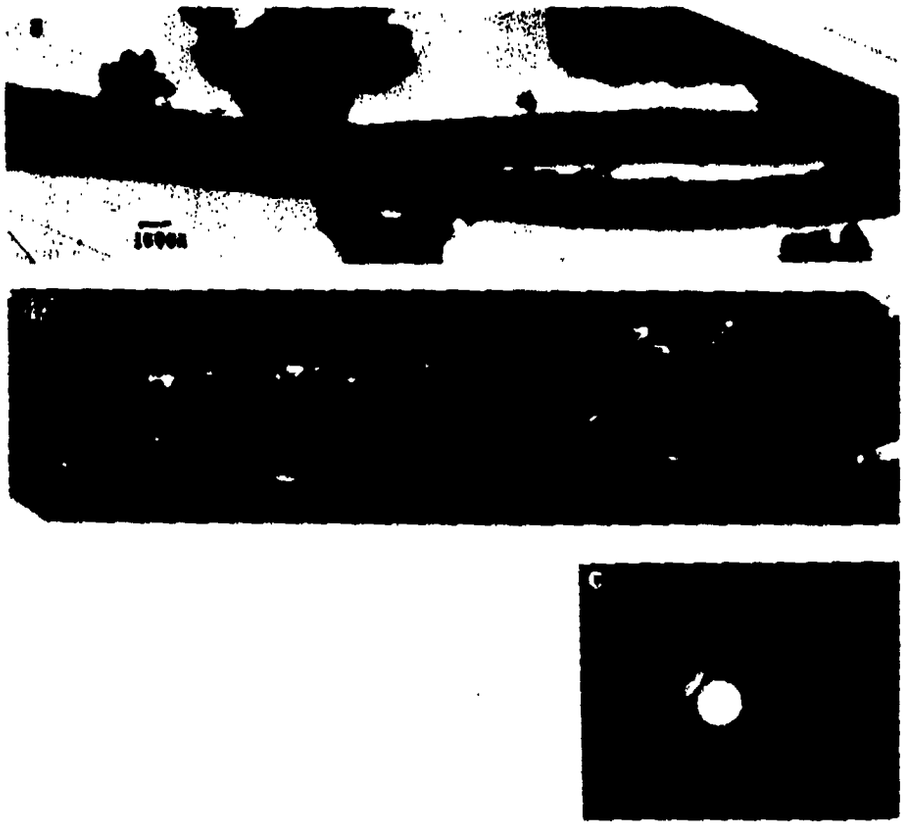

FIG. 6. Sample (D): Brake drum dust after use in a state vehicle. (a) Bright field and (b) dark field. Although the bright field is not distinctive, the high-resolution dark field and the selected area diffraction patterns are remarkably different. The crystal is quite inhomogeneous with very large grain sizes; this can happen for a varieity of reasons (see text).