states that toxicity does not seem to be a problem. Although the maximum allowable concentration in the atmosphere of dimethylformamide is relatively small, its "low volatility appears to make its use less hazardous from a vapor standpoint than that of many of the commonly-used organic solvents." It is suggested that contact of the dimethylformamide with the skin should be avoided and if it is spilled on the skin, it should be immediately flushed with a generous quantity of water. Breathing of the vapors should be avoided and adequate ventilation should be provided during use.

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PLANCHET PRESS AND ACCESSORIES FOR MOUNTING *X*-RAY POWDER DIFFRACTION SAMPLES

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Quantitative *x*-ray powder diffraction by the technique described by Klug and Alexander (1954) requires uniform packing of finely ground powder samples with minimal preferred orientation. Ideally the technique should be simple, fast, and reliable. Widely used mounts for powders are a smear on a glass slide and powder packed into depressions in glass slides (Klug and Alexander, 1954). Another approach to the problem of mounting samples is to sediment or press the powder into a mold, mount, or planchet (Adams and Rowe, 1954; Holland, *et al.*, 1955; and McAfee, 1956). All of the described devices had some shortcomings for our requirements. We therefore modified a pellet press* to pack samples to meet our needs. A monel planchet is used to avoid iron fluorescence in Cu Kα *x*-ray radiation.

* Parr Instrument Co., Moline, Illinois.

We feel that this press is an improvement over other methods because: (1) preferred orientation is minimized by compressing the sample from the side not exposed to x-rays (also recognized by McAfee, 1956); (2) the density is easily controlled by manual pressure; (3) the planchet is rigid, rugged, and permits manipulation of the sample in any orientation; (4) the planchet is interchangeable among the G. E. XRD-3 and -5 x-ray diffractometer head, the Norelco glass slide holder, and the Norelco flat sample spinner; and (5) the process of mounting the sample is very simple, fast, and reliable.

Birks (1945) has pointed out that fine grinding of powders is the best way to minimize preferred orientation errors. We find that samples must

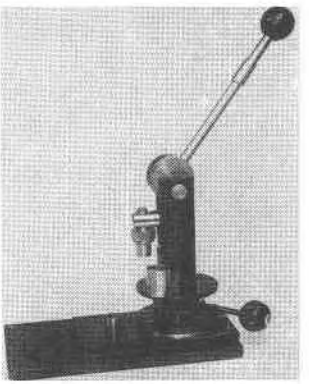

FIG. 1. Planchet press ready to be loaded with powder sample. An extra planchet sits on the press base.

be ground finer than 15 microns for best results. Grinding must be done under a solvent such as a ketone, alcohol, or hydrocarbon to avoid the mineral decomposition which occurs if one grinds dry samples. A per cent of gum arabic gives cohesion to those powders that otherwise fail to pack properly.

Using the techniques described by Klug and Alexander (1954) we obtain calibration curves of NaCl-KCl mixtures, mounted with this press, with a standard deviation of 1.1 per cent. Quartz determinations in multiphase matrices (aluminum internal standard) show a standard deviation of 2.4 per cent. These calibrations were obtained by rate meter techniques and still better results can be obtained with scalar techniques.

Photographs of the press, planchet, a clip to hold the planchet to the Norelco slide holder, and a minor modification of the Norelco flat sample spinner are shown in Figs. 1 through 3. These modifications are readily made by a good machinist.

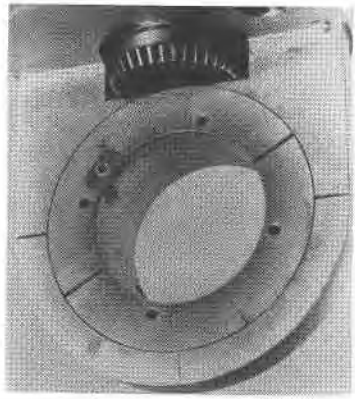

FIG. 2. Modification of the Norelco rotating flat sample holder to properly position the planchet. We have discarded the original indexing ring which obstructed the beam at low angles. This present arrangement permits studies at very low values of 2θ.

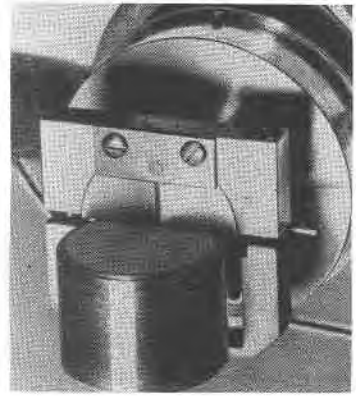

FIG. 3. Packet planchet held by a special clip on the Norelco glass slide holder. The clip slides off readily and even when left on does not interfere with the use of glass slides.

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ORIENTED OVERGROWTHS OF TENNANTITE AND COLUSITE ON ENARGITE

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A specimen from the Cerro de Pasco mine, Cerro de Pasco, Peru, now in the writer's collection, consists of a radiating aggregate of prismatic enargite crystals up to 20 mm. long. The enargite crystals are covered