THE AMERICAN MINERALOGIST, VOL. 43, JULY–AUGUST, 1958

NOTES AND NEWS

AN IMPROVED SPECIMEN HOLDER FOR THE FOCUSING-TYPE *X*-RAY SPECTROMETER*

MARTIN J. BUERGER AND GEORGE C. KENNEDY, *Massachusetts Institute of Technology, Cambridge, Massachusetts, and Institute of Geophysics, University of California, Los Angeles, California.*

ABSTRACT

A BT-cut quartz oscillator plate may be advantageously used as a specimen mount for a focusing-type *x*-ray spectrometer. The scattered radiation from this kind of mount is much less than that from a glass slide.

A variety of methods for preparing specimens for the focusing-type *x*-ray spectrometer have been described, (Adams and Rowe, 1954). Most of the methods have the objection that a large quantity of sample is required by comparison to that required for *x*-ray powder cameras. Where sample is at a premium, specimens are commonly prepared by mixing very dilute solutions of Duco cement in acetone with the sample and spreading this on the surface of a glass slide.

Scattered radiation from the glass slide, however, seriously interferes with discrimination of minor *x*-ray peaks, or peaks of phases present in small amounts. Specimen mounts of various materials were made up in a search for a specimen mount that would minimize scattered radiation. Among materials tried were various metals, cellophane, lucite and other plastics, and single crystals such as cleavage plates of calcite, cleavage plates of muscovite, and BT-cut quartz oscillator plates. Of these materials, the BT-cut quartz oscillator plate gave by far the best results.

X-ray patterns showing the relative amounts of scattered radiation from a glass slide and from a BT-cut quartz oscillator plate are shown in Fig. 1. These two patterns were made at identical power and gain settings on a North American Phillips *X*-ray Spectrometer.

Calcite cleavage fragments and muscovite cleavage plates also gave low-background scattered radiation, but in both cases major reflections from the single crystals were found within the examined range of 2θ. These strong reflections, of course, mask any reflections which occur in the same angular regions from powders on the holders.

The BT-cut quartz oscillator plate is cut at an angle of 49° from the *c* axis of a quartz crystal, sub-parallel to the $(10\bar{1}1)$ face. A small reflection occurs from a BT-cut oscillator plate at a 2θ value of 68.16° for CuKα

* Publication 88, Institute of Geophysics, University of California, Los Angeles, California.

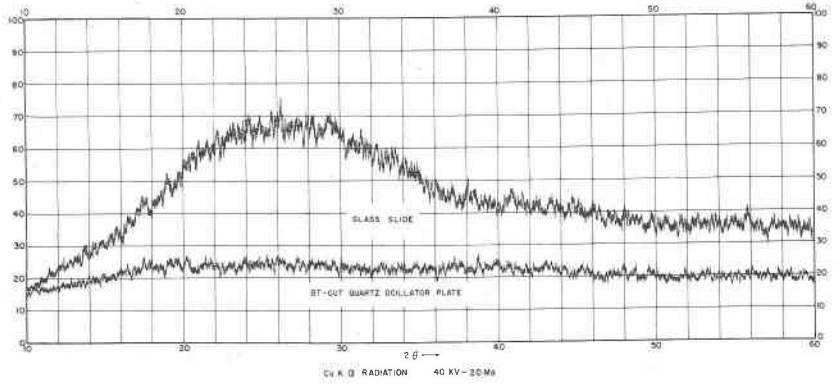

FIG. 1. *X*-ray patterns showing relative amounts of scattered radiation from a glass slide and from a BT-cut quartz oscillator plate.

radiation. This reflection is from the $(20\bar{2}3)$ plane in quartz. At this angle it gives little interference with most powder photography and, indeed, serves usefully on occasions as a built-in internal standard. The BT-cut plate diffracts at a higher angle 2θ than other standard cuts (Parrish and Gordon, 1945, p. 339). Any quartz-crystal plate cut with irrational indices would presumably serve equally well as a mount for powders.

One of the major advantages of quartz plates over glass slides as specimen mounts is that the *x*-ray spectrum can be recorded at very high power and high gain settings without disastrously masking expected reflections by scattered radiation. Thus samples comparable in size to those used in powder camera *x*-ray photography may be used, and several phases in a single small sample may be resolved. This is of particular value to the experimental petrologist where samples are often very small and at a premium.

REFERENCES

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PARRISH, WILLIAM, AND GORDON, S. G. (1945), Orientation techniques for the manufacture of quartz-oscillator plates: *Am. Mineral.*, **30**, 296–346.