

cated. The specific gravities are comparable: weinschenkite 3.26–3.27; rogersite 3.313.

This study was supported by Michigan Memorial Phoenix Project 204.

#### REFERENCES

- PALACHE, CHARLES, HARRY BERMAN AND CLIFFORD FRONDEL (1944) *The System of Mineralogy of James Dwight Dana and Edward Salisbury Dana*, 7th ed., vol. I, p. 800. John Wiley & Sons, N. Y.
- SMITH, J. LAWRENCE (1877) Examination of American minerals. No. 6. *Am. Jour. Sci.* **13**, 359–369.

THE AMERICAN MINERALOGIST, VOL. 48, SEPTEMBER–OCTOBER, 1963

#### SAMPLE CONTAINER CONTAMINATION IN THE INFRARED SPECTRA OF MINERALS

R. J. P. LYON, *Stanford Research Institute, Menlo Park, California.*

Many infrared spectra of otherwise pure minerals show the characteristic peaks of polystyrene abraded from the walls of the sample containers during preparation. In the commonly used alkali halide-pelleting technique, the sample and the potassium bromide (KBr) are shaken on a dentist's amalgamator or "Wig-L-Bug." Despite the small length of time involved (one to two minutes) sufficient abrasion takes place for the contaminant to be readily visible in the spectrum of the ensuing mixture. Polystyrene has a very marked infrared spectrum, and its presence is still observable even at concentrations far below 1 per cent.

The capsules often supplied with the amalgamator are made of polystyrene with polyethylene caps. A ball of hard "plexiglass" (polymethacrylate) is used inside the capsule to assist in the mixing action.

It is extremely important that *steel* capsules be used for mineralogical samples, rather than the plastic vials. Preferably the plexiglass ball should also be replaced with a small, hard glass bead. The beads possess little or no infrared spectrum and their effect cannot be seen in the spectrum of the sample.

Tracings of typical infrared curves, in the region from  $1500\text{ cm}^{-1}$  (6.6 microns) to  $660\text{ cm}^{-1}$  (15.0 microns) appear in Fig. 1. Curve A was prepared from powdered KBr without any shaking in the Wig-L-Bug. The KBr in curve B was shaken in a steel capsule for 2 minutes, with a glass bead, and shows only a small, broad dip in the region of  $1020\text{ cm}^{-1}$  (9.8 microns). Curves C and D show the characteristic doublets (solid black) of polystyrene at  $1490, 1448\text{ cm}^{-1}$  (6.70, 6.92 microns) and  $752, 692\text{ cm}^{-1}$  (13.30, 14.45 microns). The KBr was shaken in the polystyrene vials with

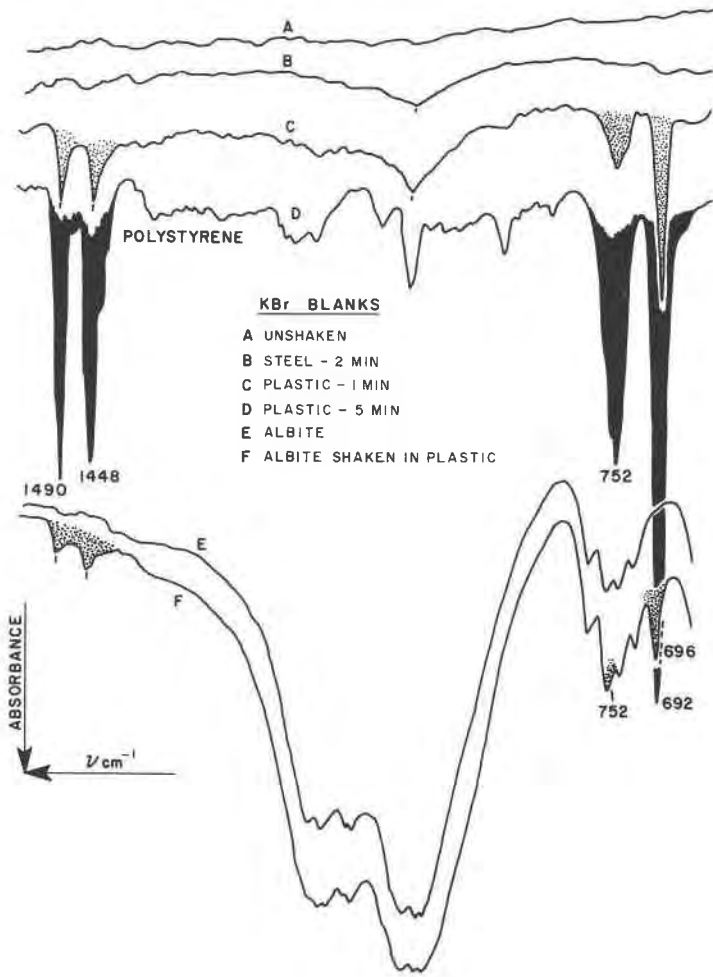


FIG. 1. Tracings of infrared absorption spectra, in the region  $1500$  to  $660 \text{ cm}^{-1}$ , showing the effect of abraded polystyrene on the spectrum of potassium bromide and albite feldspar. Abscissa linear in wavenumber.

a plexiglass bead for 1 minute (curve C) and for 5 minutes (curve D), respectively.

As a typical example of the problem, curves E and F have been taken from our files showing the same sample (an albite feldspar) with and without the contaminant (heavily stippled peaks). In each case the samples were shaken for 1 minute, but in curve E the sample was in a steel capsule. In curve F the sample was shaken in the polystyrene cap-

sule. Both samples are at 0.15% in KBr, and the curves are linear in  $\text{cm}^{-1}$ .

It is hoped that this note will help other workers avoid our time consuming error. Because of the low levels of the contamination, and the similarity of the peaks at 1448 and 1490  $\text{cm}^{-1}$  with "carbonate" peaks, and those at 752 and 692  $\text{cm}^{-1}$  to other "silicate" peaks this was not discovered for several months. Any spectrum with a sharp peak at 692 to 696  $\text{cm}^{-1}$  (14.45 microns) should always be checked for the other three peaks of polystyrene.

THE AMERICAN MINERALOGIST, VOL. 48, SEPTEMBER-OCTOBER, 1963

NOTES ON WESTERN MINERAL OCCURRENCES<sup>1</sup>

E. WM. HEINRICH, *The University of Michigan, Ann Arbor, Michigan.*

1. AN UNUSUAL SCHORL CRYSTAL FROM MONTANA

In contrast to many districts, in the Precambrian pegmatites of Montana, tourmaline is an unusual accessory mineral (Heinrich, 1949A, 1949B). Most of the pegmatites genetically related to the Dillon granite gneiss are structurally and mineralogically simple, showing no zoning and containing mainly microcline, quartz and sodic plagioclase. The Dillon granite gneiss is a post-Cherry Creek synkinematic leucogranite widely distributed in Precambrian terranes in southwestern Montana (Heinrich, 1948A, 1948B, 1960; Scholten *et al.*, 1955).

The Dillon granite gneiss is well exposed in the Armstead Prebeltian area (Lowell, 1953), where it intrudes both Cherry Creek group rocks and a group of gneisses believed to be older than Cherry Creek. Pegmatites, as sills and dikes, also cut both of the older groups of metamorphic rocks. Although much of the Dillon granite is gneissoid, its pegmatites usually are weakly foliated or not at all, at least in the Armstead area, indicating a general diminution of stress near the end of the period of crystallization of the main, parent granitic mass.

A few of the pegmatites contain scattered crystals of schorl of unusual habit (Fig. 1). The crystals are doubly terminated, with very short prismatic development. Brown tourmaline (dravite), developed metasomatically in marbles or contact altered limestones, not uncommonly shows a habit approaching equi-axial. However, pegmatitic tourmalines, both schorl and the more brightly colored Fe-low types, are almost invariably developed markedly elongate, parallel with *c*.

<sup>1</sup> Contribution No. 254. The Mineralogical Laboratory, Department of Geology and Mineralogy, The University of Michigan, Ann Arbor, Michigan.