

DTA FURNACE ASSEMBLY FOR SPECIAL ATMOSPHERES

PAUL D. GARN*

The University of Akron, Akron, Ohio, USA

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Samples which require special atmospheres can be processed and loaded into sample holders in a glove box. The sample holder assembly is inserted directly into a furnace chamber mounted in the top of the glove box. The furnace chamber is sealed off from the glove box, so atmospheres different from that of the glove box may be used in the furnace chamber.

Special sensitivity of materials to oxygen or water vapor or the need to maintain a hazardous atmosphere such as fluorine may require manipulation of the material in a glove box. When DTA is necessary, the specimen is sealed in an appropriate sample holder and removed from the glove box and taken to the instrument. This is unnecessary. Nor is it necessary to introduce any substantial apparatus into the glove box. By mounting a furnace assembly of the type shown in Fig. 1 onto a glove box, the entire preparation and loading of the sample can be carried out within the glove box, the sample(s) introduced into the furnace assembly, and the DTA performed.

The apparatus comprises a seal plate on which are mounted a furnace tube and a pair of guide rods. The heater assembly comprises a cylindrical heater in an insulating box; it has four positioning legs for the *in-use* position and shorter legs to protect the electrical plug when inverted for cooling. A control thermocouple is introduced at the top and rests against the furnace tube. Other positions could be used.

The sample holder assembly comprises a base plate on which are mounted three rods which position a plate just below the ends of the thermocouples, the sample and reference (shielded) thermocouples and screws and O-ring to seal the base plate against the seal plate. The plate extending into the hot zone positions the specimen holders within the furnace and with respect to each other. The six thermocouple leads pass through a single fitting into the glove box. Any appropriate through-connector can be used to extend them to the apparatus.

* Temporary address: Mineralogisch-Petrographisches Institut der Universität zu Köln, 5000 Köln 1, Zülpicher Strasse 49, Federal Republic of Germany

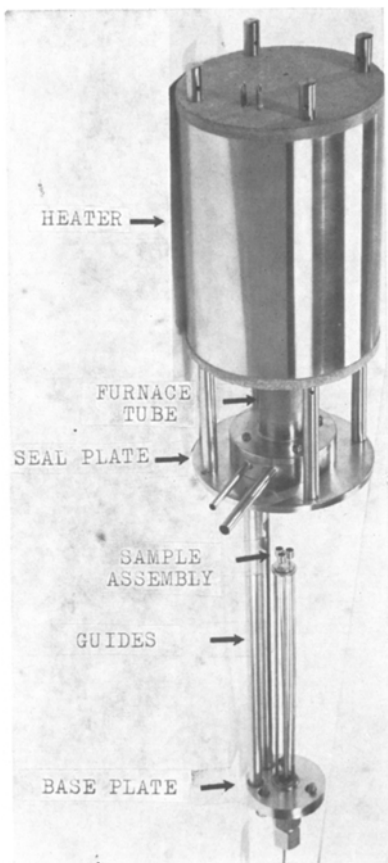


Fig. 1. Furnace assembly for mounting on a glove box

The flange of the furnace tube is fitted with two tubes for atmosphere control. Note that when the furnace is installed the furnace chamber is sealed off from the glove box; a *different* atmosphere can be used if desired. The furnace tube, the interior parts, plus the flange and the O-ring, must be chosen for use with the intended atmosphere. Pressures or vacuum can be used.

The sample holders need not be the cups shown. Micro cups or a block can be substituted. Dynamic atmospheres through the sample are not possible with this design but modification would not be difficult. Evolved gases can then be analyzed.