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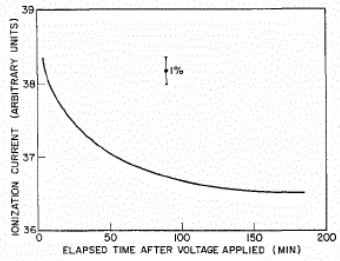


FIG. 3. Downward drift of ionization current as a function of time after application of −3000V to the ionization chamber walls. A constant intensity beam of x rays was passed through the chamber during this time.

tenths of 1% of the chamber volume, regardless of surface charge on the insulators.

We realize that covering guard rings has been an accepted method (e.g., see Boag[4]) of eliminating the loss of ionization current in chambers where the active collecting volume is supposed to be known. What we wish to point out in the present paper is that exposed guard rings and insulators can cause instability of operation as well as loss of ionization. Therefore the use of some kind of covered design is indicated, even when the collecting volume need not be known.

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Monochromatic Iodine Lamp

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AN electric discharge through iodine vapor at a pressure of approximately 0.5 Torr causes the emission of a very strong atomic iodine line at 2062 Å accompanied by lines of lower intensity at 1876, 1844, 1830, 1799, and 1783 Å. Weak bands due to molecular iodine are also present. The possibility of using the emission at 2062 Å in photochemical experiments led to the development of an iodine lamp which has been successfully used in a number of investigations.[1–3]

To achieve good transmission at 2062 Å, the iodine lamp must have a window made of high quality quartz which is not thicker than 1 mm. Consequently, the shorter wavelength lines are also transmitted with appreciable intensity. This presents a serious problem in the accurate measurement of quantum yields at 2062 Å or in studies of the influence in photochemical reactions of foreign gases (such as O_2) which do not absorb at 2062 Å but have a rapidly increasing absorption coefficient below 1900 Å. Clearly a filter is needed which has an absorption band which rises from practically zero at 2062 Å to very high values (on the order of a few hundred per atmosphere per centimeter) at wavelengths below 1900 Å. From the absorption data available in the literature it appeared that propene (or butene-1) would make an ideal filter.[4] In addition to its absorption characteristics, it is a gas at room temperature, is easily handled, and is inexpensive.

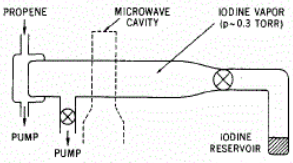


FIG. 1. Iodine lamp and filter.

The utility of a propene filter was tested in the lamp shown in Fig. 1. The lamp was made of ordinary quartz with Englehard Suprasil quartz windows. The diameter of the lamp was 2.5 cm and the absorption path length in the filter was 1 cm. The flow rate and pressure in the filter were controlled by means of needle valves located at its input and output and a small vacuum forepump. The pressure in the filter was measured using a mercury manometer and a flow meter was used to monitor the flow of propene. A 2450 MHz microwave generator operated at about 50 W of radiative power was used to produce the discharge.

To monitor the spectral output of the lamp, one end of the lamp was mated to the entrance arm of a McPherson model 225 1-m vacuum monochromator. The relative intensities of the lines emitted by the lamp below 2500 Å with the filter evacuated are reported in Table I. It is seen from Table I that the combined intensity of the lines at 1876, 1844, and 1830 Å exceeds that of the 2062 Å line

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