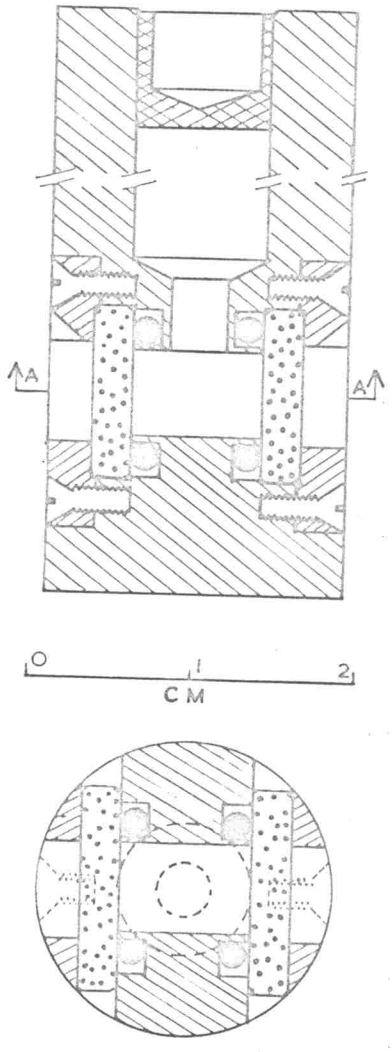

FIG. 1. High pressure optical absorption cell.

mitted to the liquid in the cell by the movement of the glass plunger.[1]

To make such a cell out of silica for measurement in the uv region is difficult and we therefore developed a small stainless steel cell which can be used inside a 10 kbar bomb fitted with 12.7 mm thick, 6 mm aperture sapphire windows.[2] Details of the cell are shown in Fig. 1. None of the dimensions are critical, but they are chosen so that the cell fills practically all the space in the high pressure bomb. The internal volume of the cell is kept as small as possible (approx. 1 cc) so that only a very small volume of liquid (approx. 3 cc) is compressed in the high pressure bomb and compression heating is thereby reduced to a minimum.

The distance between the windows of the cell is 8 mm, but the optical path can readily be reduced to 0.2 mm by inserting polished silica disks. The windows consist of 2 mm thick fused silica plates and are sealed to the cell by soft O-rings. The pressure is transmitted to the inside by a slightly tapered plug machined out of polyethylene as shown. This plug has a slight groove cut into it which almost reaches to the top edge and which allows air to escape as the plug is inserted.

When the cell is used without spacers it is filled and cleaned from the top by means of a syringe, but when spacers are used it is found necessary to remove one window in order to clean the cell properly. When several disks are used to obtain very short optical paths it is often necessary to apply about 10 bar to the cell before all the spaces between the disks are filled with liquid.

Since there is no pressure difference between the inside and the outside of the cell the optical pathlength will change with pressure only to the extent of the compression of the stainless steel and this change will be quite negligible in the context of ordinary spectrophotometric measurements. It is of course necessary to correct measurements for absorption by the pressure medium and for lens effects in the pressure windows. This correction is found from blank measurements on pure solvent at the same wavelength and pressure.

[1] A. H. Ewald and S. D. Hamann, Australian J. Chem. 9, 54 (1956).
[2] D. Langer and D. M. Warschauer, Rev. Sci. Instr. 32, 32 (1951).

Two Simple Methods of Making Grainless Fluorescent Screens*

ALVAR P. WILSKA
Department of Physics, University of Arizona, Tucson, Arizona
(Received 12 February 1965; and in final form, 4 March 1965)

VIEWING screens for electron beams are usually made of fluorescent powders. Due to the particle size, the resolution is seldom better than 25 μ. With grainless fluorescent screens, the resolution could be the same as that of the optical microscope. In order to be viewed under highest light-optical magnification, the fluorescent layer should be only a few tenths of a micron thick. Otherwise, some of the electrons, penetrating deeper, will cause fluorescence at distances for which the light microscope is not focused. However, the evaporation of thin layers of ordinary fluorescent materials[1] is difficult because of decomposition.

For light-optical reasons, the thin, grainless fluorescent layer should be attached to a transparent carrier of the thickness of a regular cover-glass used in light microscopy. An optimum thickness would be about 0.18 mm for which most of the light microscope objectives have been designed. This could be achieved by chemically treating a piece of cover-glass so that a thin fluorescent layer would form on its surface. Cover-glasses may be made of quartz and thus quartz could be used just as well as a substrate.

(1) A suspension of equal weights of ZnO and water containing a few parts per thousand of wetting agent Tween 20 and 1–2% of $MnCl_2$ is painted on a quartz sur-