

### V-Centers in Metaphosphate Glass

Metaphosphate glass on X-irradiation develops characteristic absorption bands in the visible and ultra violet regions. The visible band has been attributed to trapped electrons at the negative ion vacancy, so called F-centers, and the ultra violet band to trapped holes at positive ion vacancy, so called V-centers. It has been observed by OTLEY and WEYL<sup>2)</sup> that metaphosphate glass containing dissolved sulphur is bluish green in colour. They attributed this to  $S_2$  molecules. This glass system on X-irradiation becomes colourless which has been explained as due to conversion of  $S_2$  molecule to sulphur anion by electron trapping. Now since the electrons are trapped on the sulphur molecules the familiar F-bands are absent in systems containing sulphur. If this mechanism be justified then the metaphosphate glass rendered colourless by X-irradiation should still show the V-band.

Spectrophotometric measurements with BECKMAN spectrophotometer model DU on sulphur (about 7%) containing metaphosphate glass showed a broad absorption band in the range of 570 to 600  $\mu\text{m}$ . On X-irradiation the intensity of the band diminished and became more diffuse. At the same time it showed one weak but distinct absorption band at 340  $\mu\text{m}$ , which in the previous communication has been attributed to V-band.

Incidentally it has been noted that metaphosphate glasses containing cations like  $\text{Fe}^{3+}$ ,  $\text{Cr}^{3+}$ ,  $\text{Cu}^{2+}$  and  $\text{Ni}^{2+}$  on X-irradiation also developed the characteristic V-band at 340  $\mu\text{m}$  before the appearance of the F-band. This may be explained as due to a change in the valency state of metal by electron trapping. But unfortunately such oxidised-reduced state of the metal has not been possible to detect by chemical means.

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<sup>1)</sup> BASU, S.: Nature [London] **176**, 265 (1955).

<sup>2)</sup> OTLEY u. WEYL: J. Appl. Physics **23**, 499 (1952).