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Photodielectric Effect in CdS : Cu, Cl Fine-Crystal

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Though the photodielectric effect has been discussed by many investigators since G. F. J. Garlick and A. F. Gibson, the physical aspect of the effect has not been explained satisfactorily.

In general, two principal hypotheses are proposed to explain the photodielectric effect ;

1) The result of a real change in the dielectric constant of the material, which is caused by the presence in the excited material of a large number of polarizing centers, such centers consisting of electrons loosly bound to traps.

2) Simply the result of photoconductive change which causes the apparent capacitive change.

In this experiment, the impedance change of CdS : Cu, Cl samples was measured in the frequency range of 30 cps—100 kc, at room temperature.

The samples were prepared as follows ; CdS mixed with suitable amount (0.1—1.0 wt%) of $CuCl_2$, was fired for 60 min in nitrogen at 400°C, 600°C and 900°C. Imbeding in equal weight of paraffin, CdS : Cu, Cl fine-crystals were sandwiched between a conductive glass and a gold coating disk as the electrode.

The results obtained were as follows ;

1) The capacitance change observed on the CdS : Cu, Cl samples which are fired at 400°C, does correspond to that of the photoconductivity.

2) The capacitance change observed on the samples which are fired at 600°C and 900°C, may not be attributed solely to a change of the photoconductivity.

3) The photoconductive change was observed on the concentration of $CuCl_2$ considerably. But the photodielectric change which depends on the concentration is hardly observed.

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