

Fluorescence excited by Circularly

Polarised Light of λ 3131 Å.

A LOT of experimental work has been done on the polarisation of fluorescence of the dyestuffs in glycerine solution when excited by plane polarised monochromatic radiations of different wavelengths. In all the investigations it was observed that the polarisation of the fluorescence when excited by λ 3131 is *negative*,¹—a fact which is rather very perplexing. Now it is perhaps of interest to enquire whether the fluorescent light emitted by the dyestuffs in a viscous solution under the influence of circularly polarised light of λ 3131 is polarised or not in view of the aforesaid negative result.

It may be mentioned here in passing that the fluorescent radiations being incoherent² we should expect them to be unpolarised in the forward direction when excited by circularly polarised radiation of whatever wavelength.

The experimental arrangement is as follows:—The light of λ 3131 of mercury are issuing out of a monochromator, after being circularly polarised in the usual way with the help of a nicol and a quarter wave plate, was incident on a rectangular cell containing fluorescein in glycerine. The resulting fluorescence was observed in the forward direction through another suitably oriented quarter wave plate and a nicol. The intensity was found to be independent of the orientation of the nicol showing the unpolarised nature of the fluorescence.

S. M. MITRA.

Physics Laboratory,
Dacca University,
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¹ *Nature*, **131**, 204, 1933.² *Cur. Sci.*, **2**, 127, 1933.On the Dissociation of CO₂.

RECENTLY we published a note on the dissociation of PbO₂ and its connection with the band spectrum of PbO.¹ The calculation was based on the assumption that, since there is no difference between the O atoms either chemically or spectroscopically, the linkage will be due to four equivalent p electrons of Pb. So the products of an adiabatic dissociation of the PbO₂ molecule will be two unexcited O atoms and a Pb atom which is neither in its ground state ($s^2p^2\ ^3P$) nor as sometimes assumed in the state ($sp^3\ ^3S$) but in the anomalous term ($p^4\ ^3P$). We mentioned already that we supposed the CO₂ molecule to be linked in the same way but did not publish the calculation for CO₂ since at that time we had no possibility of testing the figures. Meanwhile Adel and Dennisson² have calculated the constants of the CO₂ molecule using the data of the infrared spectrum. It follows from their calculation that the total energy of an adiabatic dissociation of CO₂ in its three constituent atoms amounts to 33.33 volts, a value in surprisingly good agreement with the sum of the thermochemical dissociation energy of CO₂ into CO + O (5.48 volts) *plus* dissociation energy of CO into normal atoms (10.45 volts) *plus* excitation of the C atom to the anomalous $2p^4\ ^3P$ state (17.42 volts).

To our mind this agreement is a conclusive proof of our assumption as to the linkage of tetravalent carbon. A full report will be given elsewhere.

H. LESSHEIM.
R. SAMUEL.

Muslim University,
Aligarh,
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¹ *Cur. Sci.*, **1**, 374, 1933.² *Phys. Rev.*, **44**, 99, 1933.