

On the Change of Colour of Rhodochrosite, MnCO_3 , on Irradiation

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Z. Naturforsch. **45a**, 1380 (1990);
received November 15, 1990

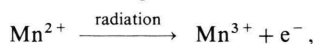
The change of colour of rhodochrosite on irradiation is discussed. A possible cause of the phenomenon is indicated.

The colours of many carbonates are caused by irradiation [1]. Experiments have shown that the radiation induced colour of a mineral is mostly due to the activation of impurities. The white shells of fresh water oysters, for example, which consist of CaCO_3 with a small amount of Mn as impurity, become gray on irradiation with γ -rays [2]. Our investigation with fresh water pearls, which have the same composition as the oyster shells, showed the same effect on γ -irradiation. The experiment was continued to look for the change of colour of manganese carbonate itself. Rhodochrosite, MnCO_3 , which owes its rose colour to Mn^{2+} , and not to impurities, was chosen for the purpose.

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Five samples of rhodochrosite were irradiated with γ -rays, upon which all of them turned brown. The brown colour was found to be stable under normal conditions. UV-VIS spectra of the samples were measured. The absorption bands of rhodochrosite, which cause its rose colour, occur due to Mn^{2+} in octahedral coordination [3]. A comparison of the spectra of a sample before and after irradiation (Fig. 1) shows that the change of colour is associated with an increased absorption, especially in the region from 600 nm to 300 nm and with the absence of the absorption minima at 490, 420, 392, 389 and 376 nm. The disappearance of these bands present before irradiation is difficult to explain.

Further investigation is needed in order to find the cause of the change in colour of rhodochrosite. It is quite possible that Mn^{3+} , resulting from the reaction



is the strong absorber, since it is also responsible for the irradiation colouring of some glasses containing manganese [4].

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- [3] K. Schmetzer and W. Berdesinski, *Z. Dt. Gemmol. Ges.* **23**, 3 (1974).
- [4] K. Nassau, *The Physics and Chemistry of Color*, John Wiley & Sons, New York 1983.

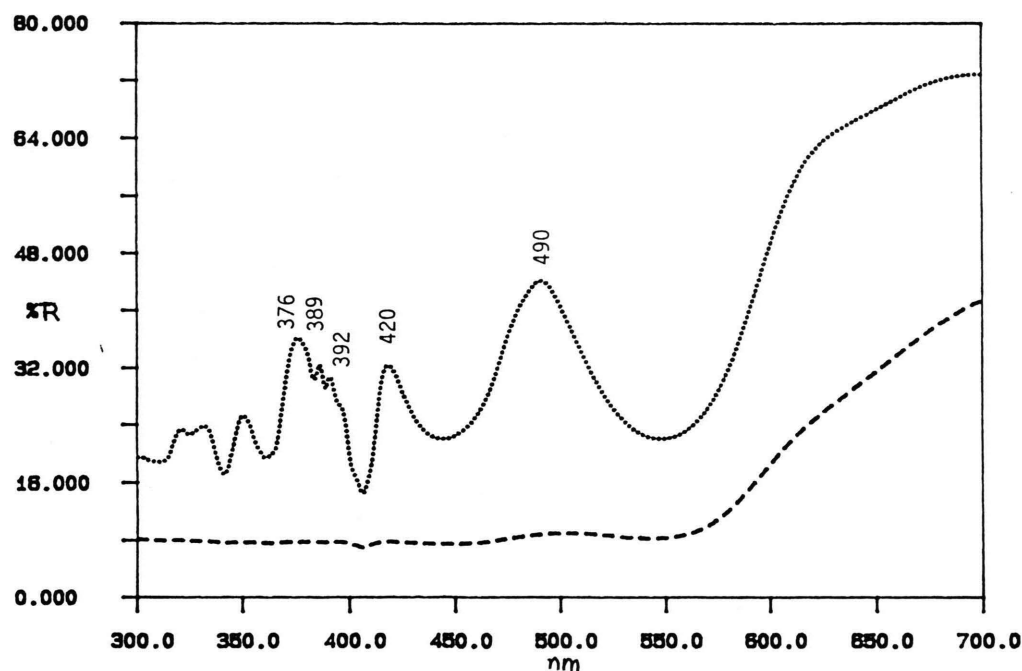


Fig. 1. UV-VIS spectra of rhodochrosite before (—) and after (---) irradiation.

0932-0784 / 90 / 1100-1380 \$ 01.30/0. – Please order a reprint rather than making your own copy.



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