

The second occurrence is in a small copper vein near Potts Gill, which has produced an astonishing variety of secondary copper, lead, and zinc minerals and which we hope to describe shortly. At this locality the serpierite forms tufts of minute, pale-blue needles and resembles the Ross Island and some of the Laurium material; it is associated with smithsonite, malachite, aurichalcite, and other secondary copper minerals.

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¹ Min. Mag. 1927, vol. 21, p. 386.

γ -Manganese dioxide from Mysore, India.

DURING an examination under the ore-microscope of manganese ore from Mysore (My 4, Bidarematti, Kumsi area), I noticed a few clumps of slightly fibrous and platy, greyish-white mineral associated with pyrolusite. An X-ray powder photograph of the mineral using Fe-K radiation gave a different pattern from that of pyrolusite. The spacings observed and tabulated below agree fairly well with the values of McMurdie and Golovato¹ for γ -MnO₂;² the intensities are estimated, and *b* indicates broad lines:

<i>d</i> , Å.	3.15	2.41	2.15	1.83	1.64	1.53	1.34
<i>I</i>	1	10 <i>b</i>	9 <i>b</i>	1	8 <i>b</i>	2	4 <i>b</i>

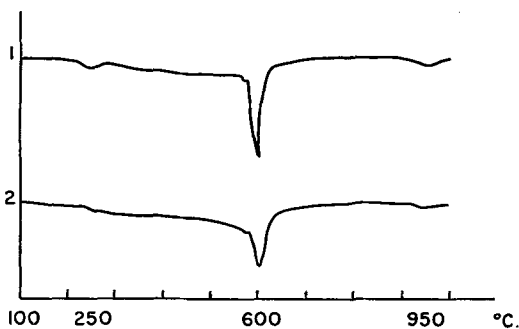
A synthetic, electrolytically deposited γ -MnO₂ from Japan was furnished for my study by the Winchester research laboratory, New Haven, Connecticut; it gave a pattern in fair agreement with the above spacings.

Differential thermal curves were obtained for both the synthetic and the naturally occurring mineral from Mysore; both show a significant endothermic peak at 600° C. and minor peaks at 250–300° C. and 950° C. The steep peak exhibited at 600° by the synthetic material is probably due to its fineness and purity.

' γ -Manganese dioxide' is unstable at high temperatures. X-ray photographs of the mineral taken after heating to 500° C. showed a pyrolusite pattern, hence the γ -dioxide could be considered as poorly crystallized pyrolusite, but the exact nature of it is still uncertain.

The oxide is of considerable industrial value. Recent research in

dry-cell technology has indicated that γ -dioxide forms a very high-grade material for the manufacture of batteries. Its occurrence has been reported¹ from the ores of Ghana, California, and New Guinea, but this is the first report of the oxide from the ores of Mysore, India.



Differential thermal analyses: (1) synthetic γ -manganese dioxide, (2) γ -manganese dioxide from Mysore.

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¹ H. F. McMurdie and E. Golovato, *Journ. Res. Nat. Bur. Stand.*, 1948, vol. 41, p. 589.

² γ - MnO_2 was first described by O. Glemser, *Ber. deut. chem. Gesell.*, 1939, vol. 72, Abt. B, p. 1879 [M.A. 9-227].