INTRODUCTION

Henritermierite is a rare Mn\(^{3+}\) silicate belonging to the hydrogarnet group of minerals. There are two occurrences, both in manganese mines, one at Tachgagalt, Anti-Atlas Mountains, Morocco (Gaudefroy et al. 1969), and the other at the N’Chwaning and Wessels mine, Kalahari manganese fields, Republic of South Africa, (Cairncross et al. 1997 and references therein).

End-member henritermierite has the formula Ca\(_3\)Mn\(^{3+}\)\(_2\)[SiO\(_4\)]\(_2\)[OH]\(_4\). Due to the Jahn-Teller distortion of octahedral Mn\(^{3+}\) ions, henritermierite is tetragonal (space group \(I4_1/acd\)) which is in contrast to other hydrogarnets of the hibschite and hydroandradite series (e.g., Kobayashi and Shoji 1987; Armbruster and Lager 1989; Lager et al. 1989; Armbruster 1995). It is believed that henritermierite from the Kalahari manganese field is a hydrothermal reaction product of the original braunite-rich manganese ores (Cairncross et al. 1997). Corresponding formation conditions have been proposed for the Morocco sample (Gaudefroy et al. 1969). At Tachgagalt henritermierite has substantial octahedral Al, whereas in the Kalahari manganese fields it occurs with nearly end-member composition.

In general, Mn\(^{3+}\)-rich garnets are rather rare in nature. Ca\(_3\)Mn\(^{3+}\)[SiO\(_4\)]\(_3\) and Cd\(_3\)Mn\(^{3+}\)[SiO\(_4\)]\(_3\) were synthesised by Nishizawa and Koizumi (1975) at 1100 °C between 3 and 6 GPa and synthetic high-pressure Mn\(_3\)Mn\(^{3+}\)\(_3\)[SiO\(_4\)]\(_3\), produced at