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Pressure-volume-temperature measurements have been carried out on NiCO_3 and MnCO_3 carbonates using a DIA-type, cubic-anvil, high-pressure apparatus interfaced with synchrotron X-ray diffraction. These data, along with those obtained previously for magnesite (MgCO_3) and siderite (FeCO_3) using the same technique^{1,2}, allow us to systematically study equation of state of the calcite-structure carbonates.

A linear correlation between M-O bond length and the room-temperature bulk modulus is, as expected, found in NiCO_3 , FeCO_3 and MnCO_3 carbonates. The product of the room-temperature bulk modulus and unit-cell volume at ambient condition is observed to be constant in these three compounds, similar to literature observations in other systems of isostructural series. Magnesite, however, deviates significantly from the linear trends in both correlations. It is speculated that carbonates with alkaline elements as cations behavior differently at high pressures from those with transition metals as cations.

References:

¹Zhang, J., I. Martinez, F. Guyot, and S. K. Saxena: *In situ* X-ray diffraction study on magnesite at high pressure and temperature, Phys. Chem. Mineral, in press.

²Zhang, J., I. Martinez, and F. Guyot: *In situ* X-ray diffraction studies on magnesite and siderites at high pressure and temperature, Terra Nova Suppl., V. 8, p70, 1996.