a theoretical thermal-expansion–pressure relation, but this is beyond the scope of the present work.

The discontinuous changes in compressibility and thermal expansion which occur when the transition is induced with pressure are in sharp contrast to the more or less continuous changes in thermal expansion and compressibility which occur in the thermally induced transition.[27] The difference is believed to arise because the effects of pressure proceed at essentially constant temperature, whereas, the effects of temperature do not occur at constant volume. For this alloy, the exchange interactions are extremely volume dependent and the volume change resulting from the thermal expansion is sufficient to alter the magnetic exchange interactions by a significant amount. Consequently, to consider thermally induced disorder alone, the thermal expansion and compressibility should be analyzed at constant volume. It appears that most measurements of the effect of temperature on the magnetic and physical properties of this alloy have considered the Curie temperature fixed even though the temperature changes have been sufficient to produce large volume changes which would alter the exchange interactions.

In summary, this paper has reported shock-wave measurements of the compressibility of fcc 30% Ni–70% Fe which show a well-defined, pressure-induced, second-order ferromagnetic to paramagnetic transition. From these measurements, a complete description is obtained of the thermodynamic variables which change at the transition. The results provide a more complete description of the thermodynamic effects of the change in the magnetic interactions with pressure than has been previously available.

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