

## **Calorimetric studies of the energetics of order-disorder in the system $\text{Mg}_{1-x}\text{Fe}_x\text{Ca}(\text{CO}_3)_2$**

**ALEXANDRA NAVROTSKY,<sup>1,\*</sup> DEBRA DOOLEY,<sup>2</sup> RICHARD REEDER,<sup>3</sup> AND PATRICK BRADY<sup>4</sup>**

<sup>1</sup>Thermochemistry Facility, Department of Chemical Engineering and Materials Science, University of California at Davis, Davis, California 95616, U.S.A.

<sup>2</sup>Department of Earth, Space, and Environmental Sciences, Piedmont College, Demorest, Georgia 30535, U.S.A.

<sup>3</sup>Department of Geosciences, State University of New York at Stony Brook, Stony Brook, New York 11794, U.S.A.

<sup>4</sup>Sandia National Laboratories, Albuquerque, New Mexico 87131, U.S.A.

### **ABSTRACT**

Calorimetric studies by Chai and Navrotsky (1996) on dolomite-ankerite energetics have been extended by including two additional types of samples: a very disordered stoichiometric  $\text{MgCa}(\text{CO}_3)_2$  prepared from low-temperature aqueous solution and three largely ordered natural samples of intermediate iron content.

Combining these data with previous work, we see three distinct energetic trends. These represent samples with nearly complete order, nearly complete disorder, and intermediate order. From these trends, the enthalpy of complete disordering is estimated to be  $33 \pm 6$  kJ/mol for  $\text{MgCa}(\text{CO}_3)_2$  and  $18 \pm 5$  kJ/mol for  $\text{FeCa}(\text{CO}_3)_2$ .