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Most of the industrial applications of vermiculite are based on the mineral's ability to exfoliate. This is due to the presence of interlayer water located between the silicate sheets that is converted to steam when suddenly heated and forces the silicate layers to move apart. This exfoliation is an endo-thermic reaction and the amount of energy differs for some kind of vermiculites.

Common DTA/DSC measuring systems work with a selectable heating rate. For an in-situ analysis of the sudden and short-time exfoliation process a modified measuring device is necessary. Here the experimental work was done with a drop-in calorimeter. The first step is to heat up the furnace that is followed by dropping the sample immediately.

The change of the heat flow is observed and the enthalpy is calculated from the peak area. A specific dehydration enthalpy can be derived if the mass loss is taken into account. It is shown that some differences in enthalpy are based on the variations in the layer charge that can partly be explained by changes in the $\text{Fe}^{3+}/\text{Fe}^{2+}$ ratio.

The consequence for industrial exfoliation processes is to prefer vermiculites with low changes in enthalpy in order to minimize the consumption of gas and oil.