

"Concentration" – A New Evaluation Routine in *Proteus*® 8.0 Analysis

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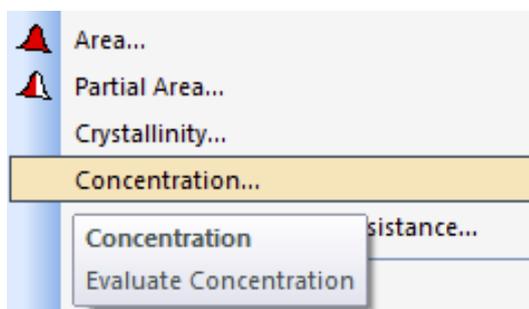
As of the latest *Proteus*® 8.0 version, the new "Concentration" evaluation routine for DSC signals is available (see figure 1).

The enthalpy of an evaluated peak area is divided by the nominal 100% enthalpy value leading to the mass concentration (in unit wt%) of a particular component in the sample measured, where the sample can be a mixture of different components. This calculation is based on the assumption that there is no kind of influence of the matrix on the peak area of the particular component. Furthermore, good thermal contact of the entire sample to the crucible and thus to the DSC sensor is decisive.

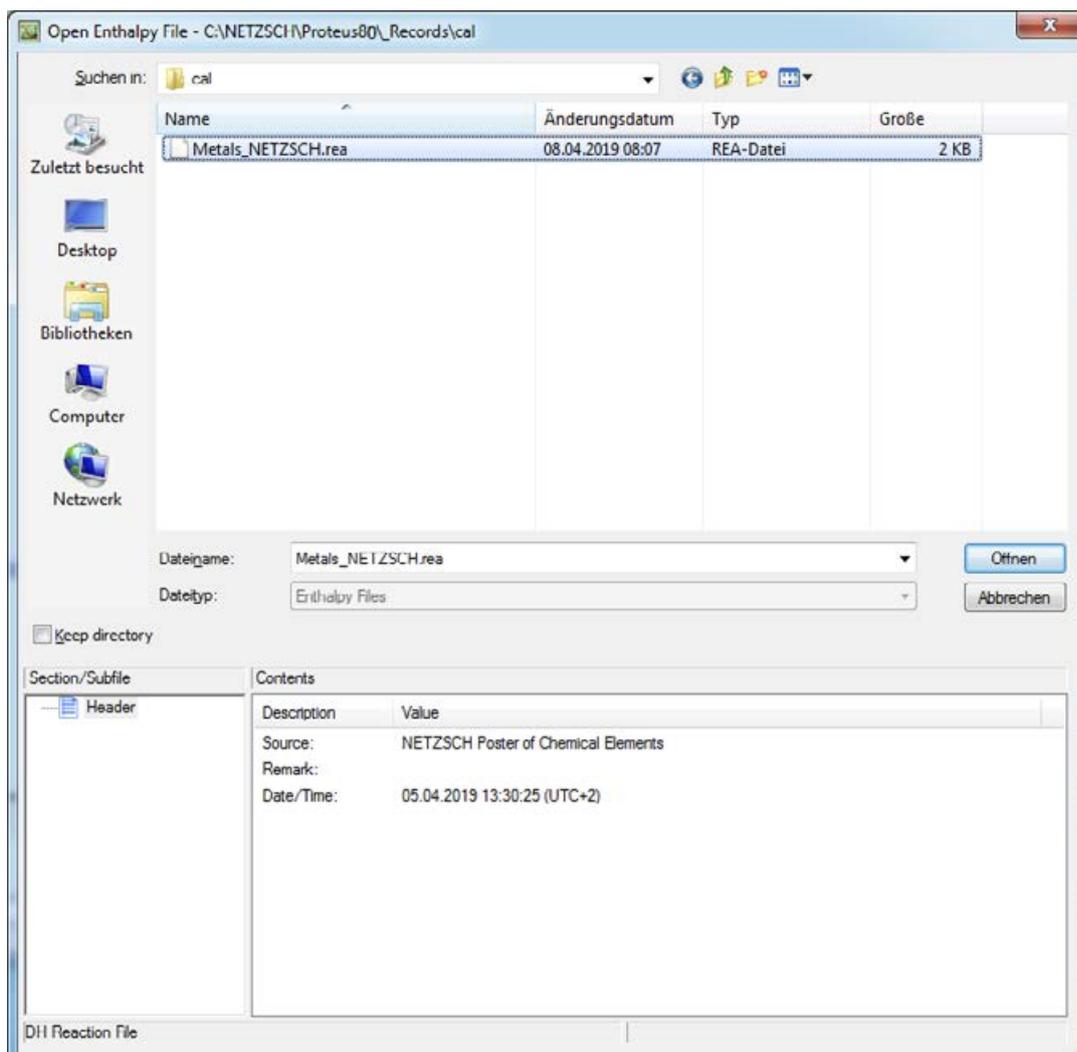
The 100% enthalpy values are selected from a table; NETZSCH supplies a list of melting enthalpies of most common metals (see figure 2). Users can, of course, create their own tables.

After selecting the enthalpy table, a particular substance must be chosen from that table (see figure 3). For the example shown here, pure tin with a mass of 0.52 mg was embedded in an Al₂O₃ powder matrix and the DSC melting peak was measured (see figure 4). The entire sample mass was 27.38 mg. From the measured melting enthalpy of about 1.1 J/g, a mass concentration of 1.85 wt% was calculated by the software. This value matches with the mass ratio of 0.52 mg / 27.38 mg = 1.90 wt% present in the sample.

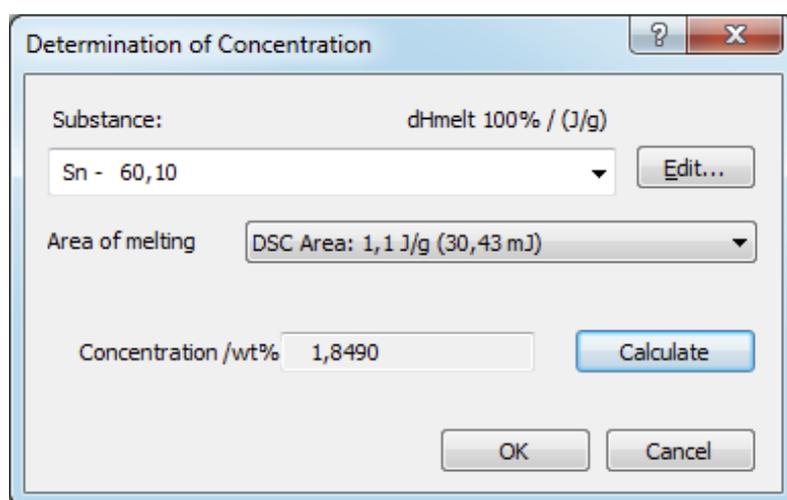
The example shown demonstrates the determination of a metallic amount in a ceramic sample. Another application could, for example, be the determination of the amount of a component in pharmaceutical mixtures.



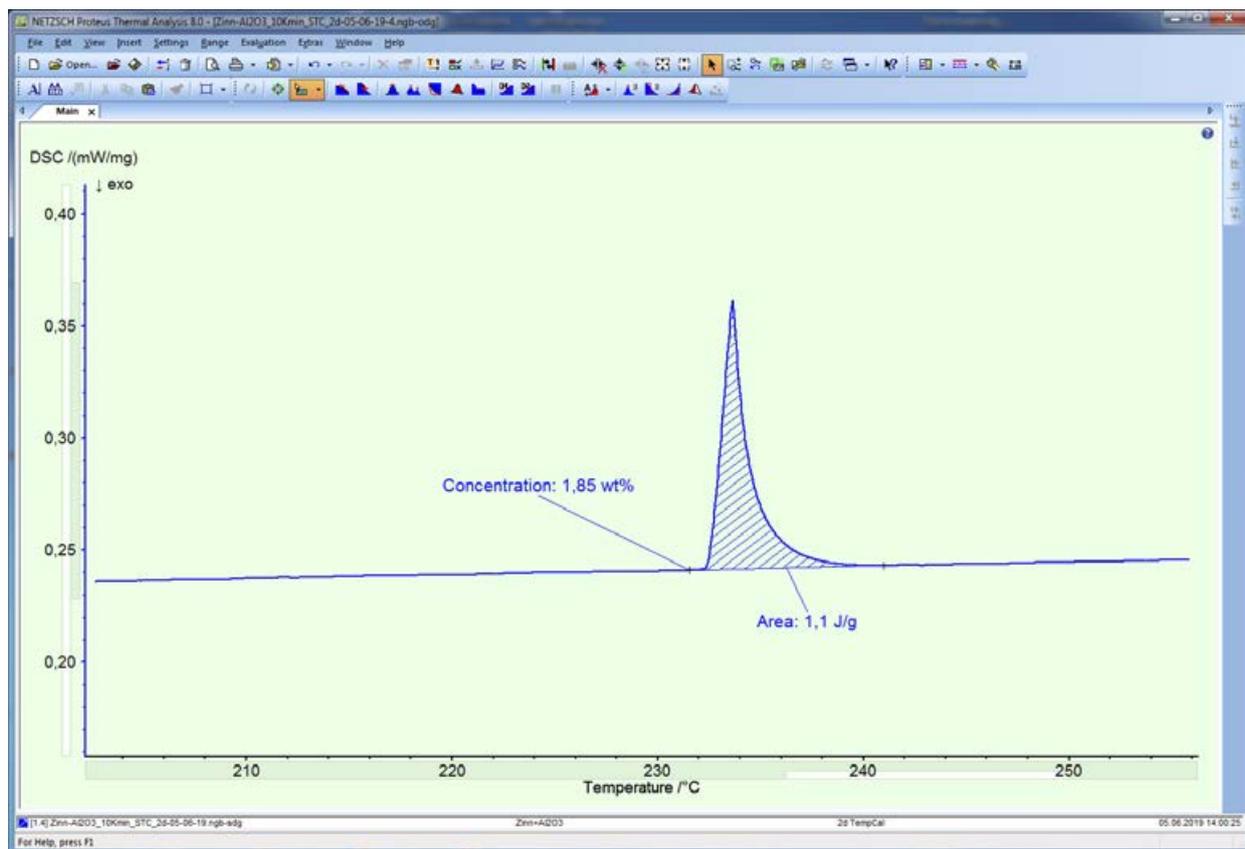
1 "Concentration ..." evaluation routine in the Evaluation menu of *Proteus*® analysis version 8.0



2 Selection of an enthalpy table used for the "Concentration" feature



3 Dialogue for selection of the substance and calculation of the concentration



- 4 DSC melting peak of 0.52 mg tin in an Al₂O₃ compacted powder matrix (entire sample mass: 27.38 mg). "Area" and "Concentration" evaluations were carried out.