



COST 526

**“Automatic Process Optimization in Materials Technology”
(APOMAT)**

Half-Yearly Report

1. Reporting Period	1.1.2003 – 30.06.2003
Project title	Optimization of heat treatment of magnetic materials applying the thermomagnetic curves data
Project leader Organization	Dr. Tomáš Žák Institute of Physics of Materials, AS CR, Žižkova 22, CZ-61662 Brno
Main collaborators involved	Faculty of Natural Sciences and Engineering, University of Ljubljana

2. Funding Situation	
Amount of money received specifically for COST	7 kEuros
Other resources partially used for the project	3 kEuros

3. International Collaboration (mention group and type of work done in collaboration during the reporting period)
Participation in the Working Group Meeting in Brussels + project progress report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO
D.M. Minić, Faculty of Physical Chemistry, University of Belgrade, Yugoslavia Collaboration on an FeW material, thermomagnetic curves measurement

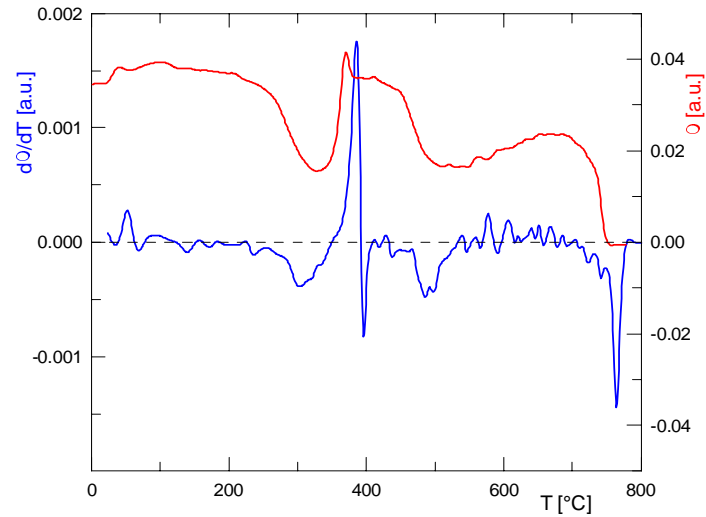
4. Industry participation (mention name of companies and work done in collaboration during the whole project)
No

5. Meetings, visits, exchange of scientists, short-term scientific missions	Location, date
ICM 2003	Rome, July 27 – August 1

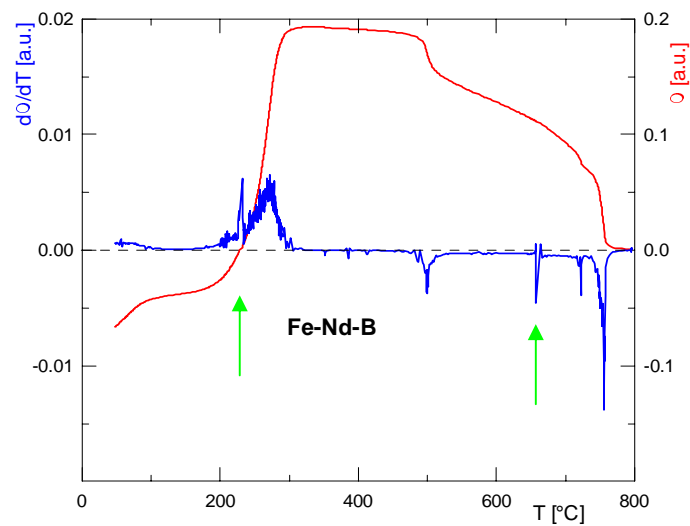
6. Progress within the reporting period

(Not exceeding 3 pages, including tables and figures)

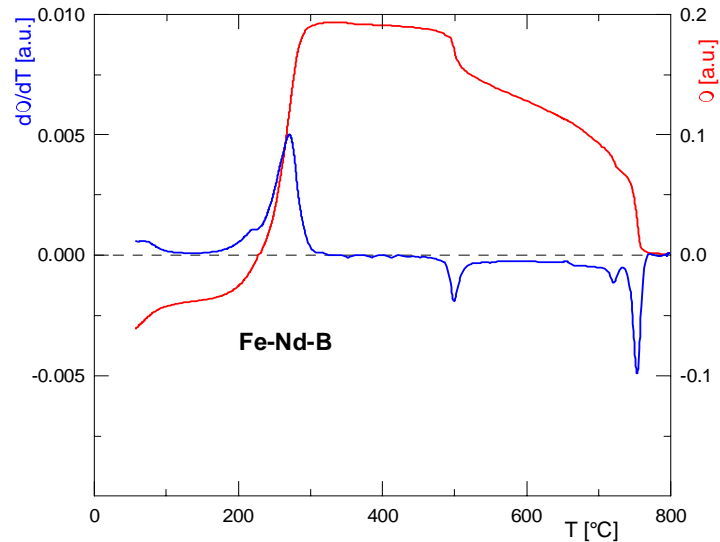
In this period we concentrated on the processing and evaluation (fitting) of the thermomagnetic curve. As this curve is not always of perfect quality (see the figure below), filtering and smoothing must be applied before final evaluation.



In case of poor filtering of measured curve some device effects (artefacts) are suppressed but some of them are highlighted. It is necessary to find suitable filtering.

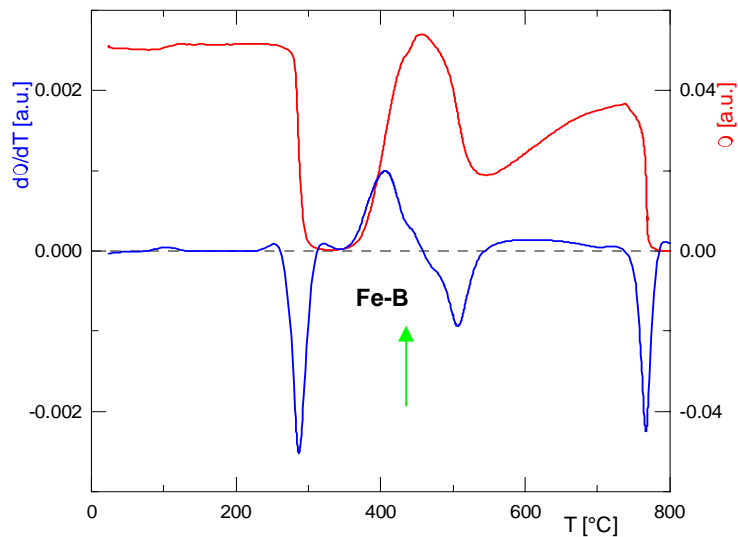


In case of good filtering of measured curve only material characteristics remain and it is easy to find critical temperatures.

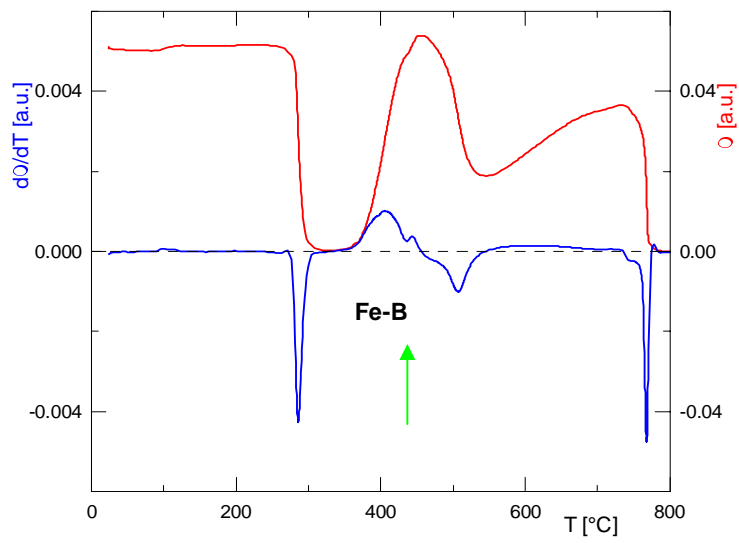


Similarly, suitable degree of smoothing must be found.

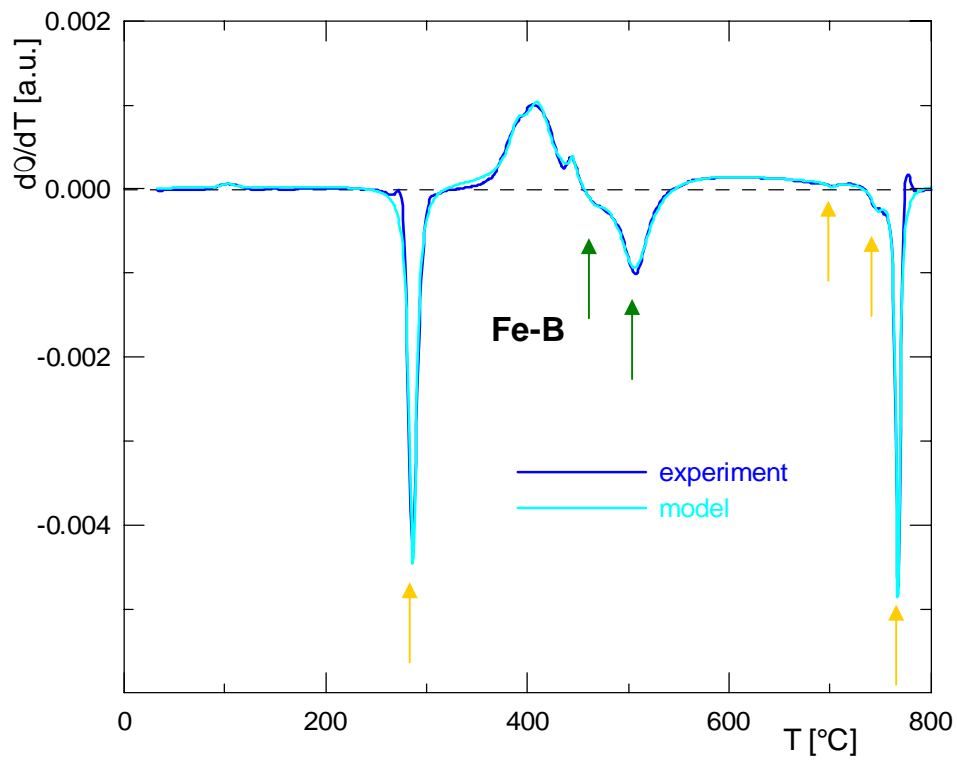
If excessive smoothing of thermomagnetic curve is applied important peaks can be removed. it is necessary to be careful.



Adequate smoothing of thermomagnetic curve maintains all features of the curve. Consequently, it is easy to find critical temperatures (see the next page).



After filtering and smoothing: modelling of the thermomagnetic curve
 Although the curve shape is still not perfect, all critical temperatures are visible and various kinds of processes can be distinguished. Various linewidths can be seen as well.



Further improvement of model function is supposed.

7. List of publications

a) Published

N. Talijan, T. Žák, J. Stajić-Trošić, V. Menushenkov: Effect of cooling rate on the microstructure and magnetic properties of melt spun Nd-Fe-B alloys, J. Magn. Magn. Mater. 259-259 (2003) 577-579.

b) Submitted for publications

T. Žák, O. Schneeweiss, D. Minić: Structure and Phase Analysis of Electrochemically Synthesized Fe-W, accepted in J. Magn. Magn. Mater.

c) In preparation

D.M. Minić, T. Žák, O. Schneeweiss, M. Ristić: Synthesis and properties of Fe-W.