



COST 526

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

**Half-Yearly Report**

<b>1. Reporting Period</b>	<b>1.7.2003 – 31.12.2003</b>
Project title	<b>Optimization of heat treatment of magnetic materials applying the thermomagnetic curves data</b>
Project leader Organization	<b>Dr. Tomáš Žák</b> Institute of Physics of Materials, AS CR, Žižkova 22, CZ-61662 Brno
Main collaborators involved	Lukasz Rauch Faculty of Metallurgy and Material Science Department of Computer Methods in Metallurgy University of Science and Technology, Krakow

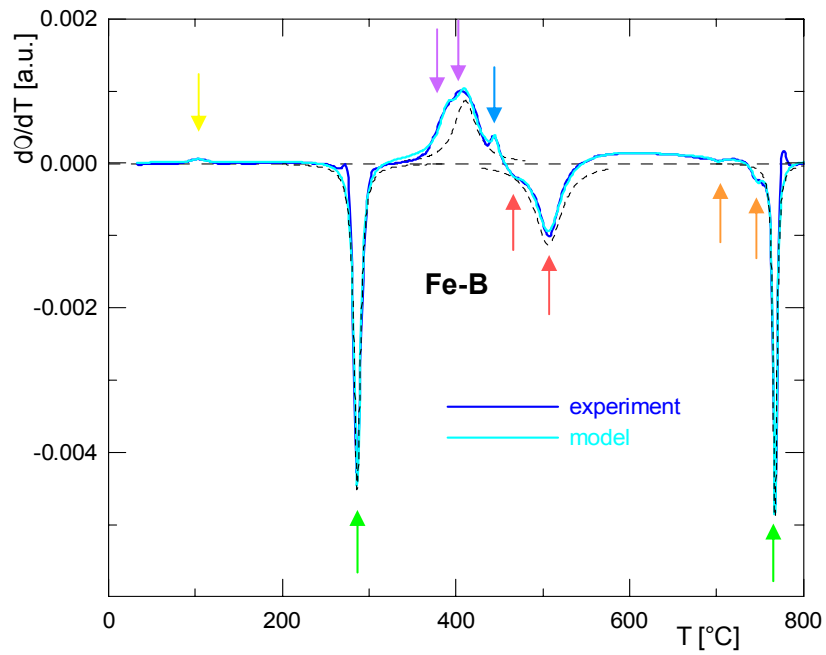
<b>2. Funding Situation</b>	
Amount of money received specifically for COST	<b>7 kEuros</b>
Other resources partially used for the project	<b>3 kEuros</b>

<b>3. International Collaboration</b> (mention group and type of work done in collaboration during the reporting period)
Participation in the Working Group Meeting in Krakow + project progress report <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO

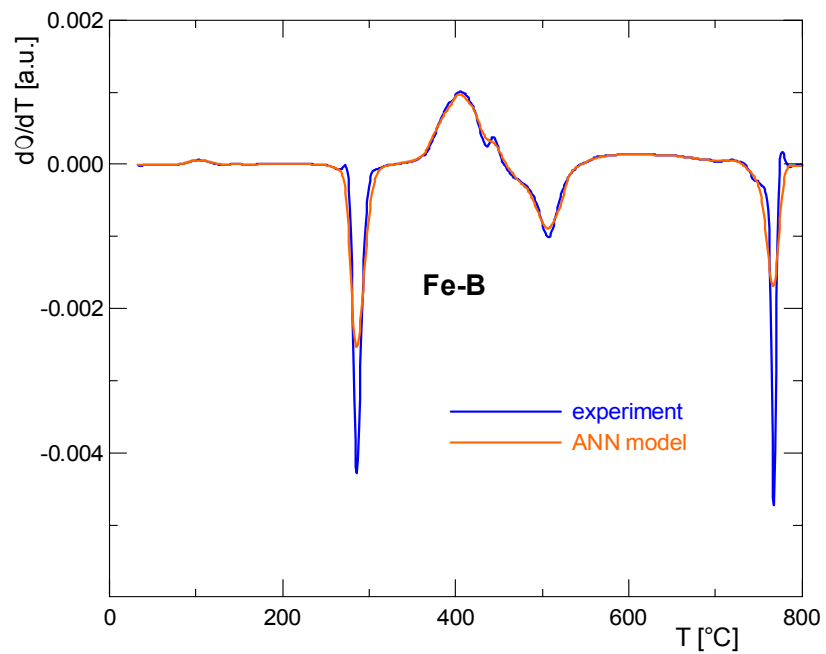
<b>4. Industry participation</b> (mention name of companies and work done in collaboration during the whole project)
<b>No</b>

<b>5. Meetings, visits, exchange of scientists, short-term scientific missions</b>	<b>Location, date</b>

<b>6. Progress within the reporting period</b> (Not exceeding 3 pages, including tables and figures)
Parametric modelling of the thermomagnetic curve with manual suggestion of peak positions. Critical temperatures are visible, various kinds of processes can be distinguished, similarly as various linewidths.

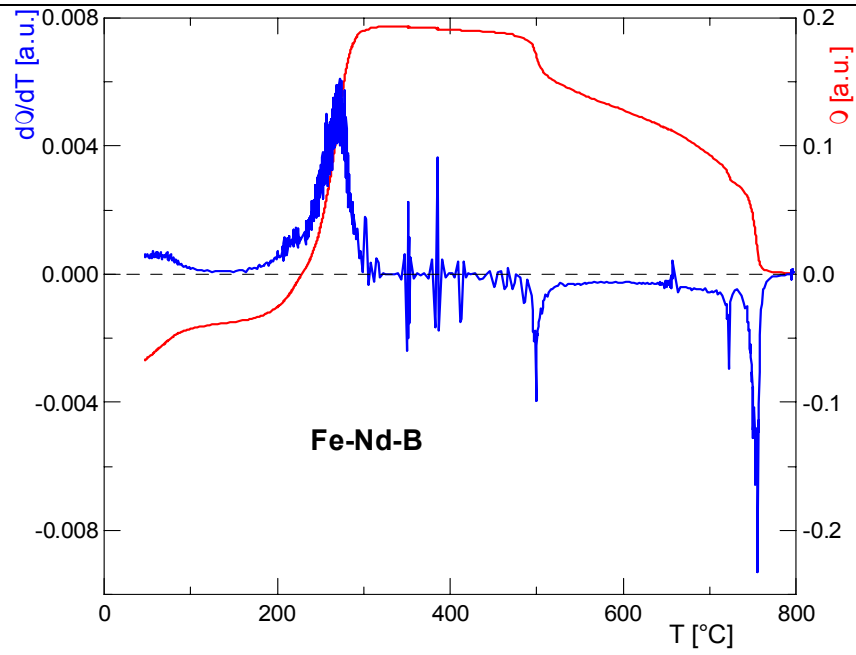


Nonparametric modelling of the thermomagnetic curve. Here is no manual settings necessary, however, some critical temperatures are lost.

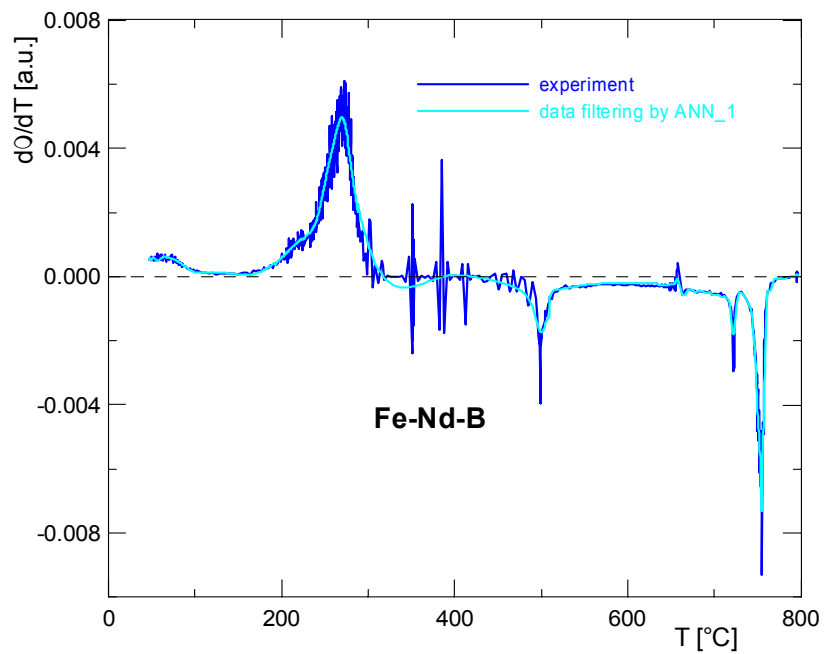


Thermomagnetic curve derivative. It is an apparently smooth curve but with problematic derivative. Peaks are not only at critical temperatures. Will be the nonparametric model helpful?

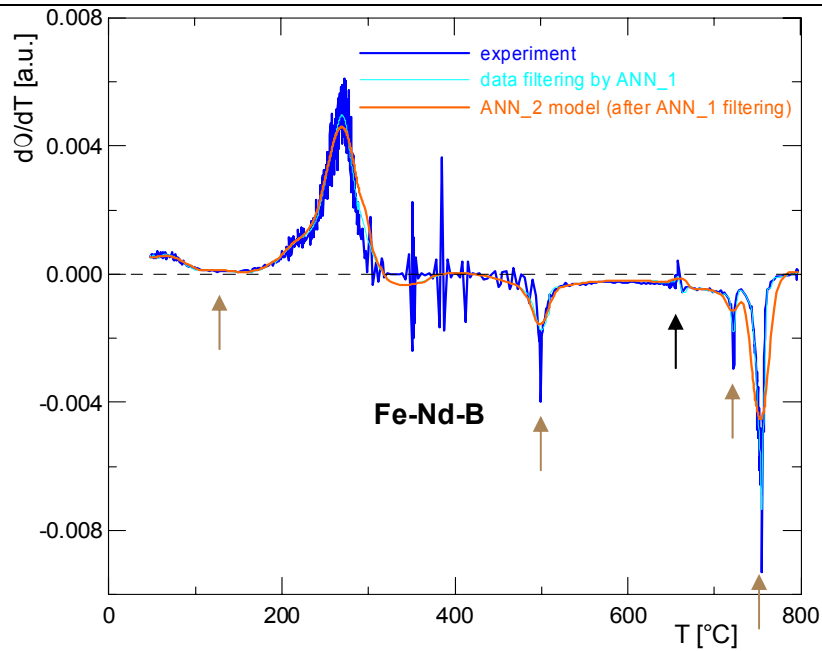




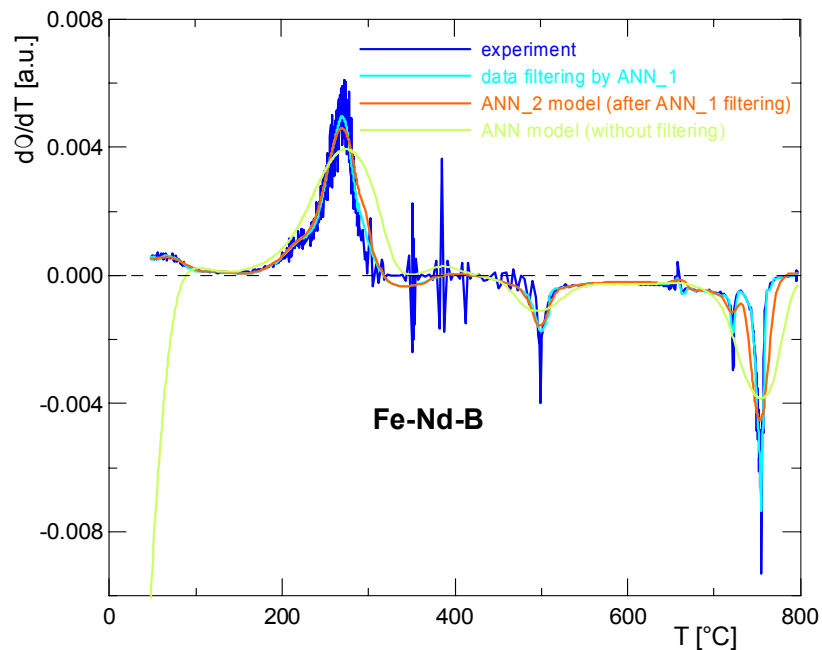
Preliminary filtering of thermomagnetic curve. Most of artefacts are removed and shape of lines is not substantially distorted.



Nonparametric modelling of the thermomagnetic curve. Combination of data filtering with subsequent modelling. The line position is marked.



Nonparametric modelling of the thermomagnetic curve (without filtering). Here the preliminary filtering is necessary, as the noise disturbs the model. Only basic shape of the curve has been retained.



Now the suitable compromise between parametric and nonparametric modeling will be estimated, also what about the connection with preliminary data filtering.

## 7. List of publications

a) Published

b) Submitted for publications

**Jolanta Talar, Tomáš Žák, Lukasz Rauch, and Jan Kusiak: Filtering of thermomagnetic data curve using artificial neural network and wavelet analysis.**

c) In preparation

**Tomáš Žák: First steps with digital AC magnetometer.**