

COST 526 - 'Automatic Process Optimization in Materials Technology' – (APOMAT)  
**Final Report – 31 July 2005**  
**Summary sheet**

Project Code	<b>CZ4</b>
Title	<b>Optimization of heat treatment of magnetic materials applying the thermomagnetic curves data</b>
Project Leader	Dr. Tomáš Žák
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Main collaborators involved	Łukasz Rauch

**Funding Situation** (for the whole project)

Amount of money received specifically for COST	<b>30</b> kEuros
Other resources partially used for the project	<b>12</b> kEuros

**International Collaboration** (mention group and type of work done in collaboration during the whole project)

Łukasz Rauch  
Faculty of Metallurgy and Material Science, Department of Computer Methods in Metallurgy,  
University of Science and Technology, Kraków

**Industry participation** (mention name of companies and work done in collaboration during the whole project)

The method has not been developed to the point in that it can be immediately implemented in the industrial field. There was no company directly involved into the project.

**Meetings, visits, exchange of scientists, short term scientific missions** (mention main events during the whole project)

MEASUREMENT 2005, international conference

**Location, date**

Smolenice, Slovakia  
May 30 – June 1, 2005

### Main Outcome of the project (mention only the major points)

Thermomagnetic curves bring enough information to characterise the main processes during heat treatment.

To find critical temperatures of various processes, derivative of the thermomagnetic curve is to be implemented, followed by its filtering.

To fit model of derivative of thermomagnetic curve, least-squares fit can be used.

The gained critical temperatures of particular processes serve for optimization of supposed heat treatment process.

### Publications, related to this project

#### Published

Žák T.: First steps with digital ac magnetometer, Journal of electrical engineering, **55** [10/s] (2004), 131-132.

Žák T., Schneeweiss O., Minić D.M.: Structure and phase analysis of electrochemically synthesized Fe-W, J. Magn. Magn. Mater. 272-276 (2004) e1119-e1121.

Rauch Ł., Talar J., Žák T., Kusiak J.: Filtering of thermomagnetic data curve using artificial neural network and wavelet analysis. In: Proceedings of the International Conference on Artificial Intelligence and Soft Computing 2004, Lecture Notes in Artificial Intelligence, Vol. 3070, 2004, 1093-1098.

#### Submitted for publication

Žák T., Rauch Ł., Talar J.: Mathematical Processing of Thermomagnetic Curves, MEASUREMENT 2005, Smolenice, Slovakia, May 2005.

#### In preparation

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

Will you continue the actual cooperation with your partners after the end of the action?

Yes

No

Would you participate in a possible "spin-off" action continuing the present one?

Yes

No

Will you continue your present work/collaboration with another European action?

Yes

No