

# MÖSSBAUER SPECTROSCOPY IN MATERIALS SCIENCE 2018

## SCIENTIFIC PROGRAMME

MONDAY, JUNE 25, 2018

9:00 - 12:00 **Registration**

12:00 - 13:00 **Lunch**

13:00 - 13:15 **Opening Session**

A. Lančok

13:15 - 16:00

chair: A. Lančok

13:15 - 14:00 **How and why I met Mössbauer spectroscopy**

**PL 01**

K. Závěta

14:00 - 14:30 **Ferrates and ferrites - applications in water treatment**

L. Machala, V.K. Sharma, R. Zboril

14:30 - 15:00 **Mössbauer spectroscopy of Mundrabilla and Gibeon iron meteorites**

M.V. Goryunov, M.I. Oshtrakh, Z. Klencsár, E. Kuzmann, V.I. Grokhovsky, V.A. Semionkin

15:00 - 15:30 **Application of heat resistant materials in development of sealed reaction chambers for in situ Mössbauer spectroscopy**

M. Jiruš, J. Kopp, J. Pechoušek

15:30 - 16:00 **Investigations of siderite transformation by thermophilic microbial culture**

M.A. Gracheva, N.I. Chistyakova, A.V. Antonova, V.S. Rusakov, Yu.A. Koksharov, T.Yu. Kiseleva, D.G. Zavarzina

16:00 - 16:30 **Coffee break**

16:30 - 18:15

chair: M. Miglierini

16:30 - 17:15 **Mössbauer spectroscopy in microbial transformation of iron-containing minerals in alkaline conditions**

**PL 02**

N.I. Chistyakova, A.V. Antonova, M.A. Gracheva, D.I. Pchelina, T.Yu. Kiseleva, D.G. Zavarzina, T.N. Zhilina, S.N. Gavrillov

17:15 - 17:45 **Structural features of oxygen deficient strontium ferrite  $\text{SrFeO}_{3-\delta}$**

V. Sedykh, O.G. Rybchenko, A.N. Nekrasov, V.I. Kulakov

17:45 - 18:00 **Study of iron functionalized nanoparticles of titanium dioxide**

L. Volfová, A. Lančok

19:00 - 22:00 **Welcome party**

**TUESDAY, JUNE 26, 2018**

|                                    |               |   |
|------------------------------------|---------------|---|
| 9:00 - 10:45<br>chair: K. Závěta   | 9:00 - 9:45   | <b>Characterization of direct current and pulse plated novel quaternary Sn-Fe-Co-Ni alloys</b><br><b>PL 03</b><br><u>E. Kuzmann</u> , L. Sziráki, S. Stichleutner, Z. Homonnay, D. Zalka, G. B. Lak, M. El-Sharif, C. U. Chisholm   |
|                                    | 9:45 - 10:15  | <b>Crystallization of metallic glasses inspected by <i>ex situ</i> and <i>in situ</i> techniques based upon hyperfine interactions</b><br><u>M. B. Miglierini</u> , V. Procházka, V. Vrba   |
|                                    | 10:15 - 10:45 | <b>Probe Mössbauer study of manganite ScMnO<sub>3</sub></b><br><u>S. Šandalová</u> , I. Glazkova, A. Sobolev, I. Presniakov   |
| 10:45 - 11:15 Coffee break         |               |   |
| 11:15 - 13:00<br>chair: L. Machala | 11:15 - 11:45 | <b>Characterization of nanoparticle systems considered for plant nutrition</b><br><u>Z. Klencsár</u> , V.K. Kis, S. Stichleutner, L.K. Varga, A. Ábrahám, E.Gy. Szabó, L. Szabó, J. Mantilla, J.A.H. Coaquira, V.K. Garg  |
|                                    | 11:45 - 12:15 | <b>Investigations of iron compounds transformations by syntrophic culture</b><br><u>A.V. Antonova</u> , N.I. Chistyakova, M.A. Gracheva, V.S. Rusakov, D.G. Zavarzina, T.N. Zhilina   |
|                                    | 12:15 - 12:45 | <b>Investigations of the phase separation in lanthanum manganites doped with calcium atoms</b><br><u>D.I. Pchelina</u> , I.Yu. Medvedskaya, N.I. Chistyakova, Yu.A. Alekhina, V.D. Sedykh, V.S. Rusakov   |
|                                    | 12:45 - 13:00 | <b>Spleen tissues studied by Mössbauer spectrometry</b><br><u>I. Bonková</u> , M. Miglierini, T. Kmječ, M. Kopáni, M. Bujdoš, M. Štefánik   |
| 13:00 - 14:30 Lunch                |               |   |
| 14:30 - 16:00<br>chair: E Kuzmann  | 14:30 - 15:00 | <b>Mössbauer study of Eu<sub>0.57</sub>Ca<sub>0.43</sub>Fe<sub>2</sub>As<sub>2</sub> and Eu<sub>0.73</sub>Ca<sub>0.27</sub>(Fe<sub>0.87</sub>Co<sub>0.13</sub>)<sub>2</sub>As<sub>2</sub>: A comparison to '122' iron-based superconductors parent compounds EuFe<sub>2</sub>As<sub>2</sub> and CaFe<sub>2</sub>As<sub>2</sub></b><br><u>K. Komędera</u> , A. Błachowski, K. Ruebenbauer, J. Żukrowski, S. M. Dubiel, L. M. Tran, M. Babij, Z. Bukowski |
|                                    | 15:00 - 15:30 | <b>Magnetic and Structural Transitions in Pb(Fe<sub>0.5</sub>M<sub>0.5</sub>)O<sub>3</sub> (M=Nb, Sb): Mössbauer and XRD study</b><br><u>T. Kmječ</u> , J. Plocek, K. Závěta, J. Kohout   |
|                                    | 15:30 - 15:45 | <b>Hyperfine parameters of pure and metal-substituted orthorhombic ε-M<sub>x</sub>Fe<sub>2-x</sub>O<sub>3</sub> from DFT calculations (M = Al, Ga, Si)</b><br><u>D. Kubániová</u> , J. Kuriplach  |
|                                    | 15:45 - 16:00 | <b>Nanomagnets ε-Al<sub>x</sub>Fe<sub>2-x</sub>O<sub>3</sub> and ε-Ga<sub>x</sub>Fe<sub>2-x</sub>O<sub>3</sub>: Structure, magnetism and hyperfine parameters</b><br><u>L. Kubíčková</u> , J. Kohout, P. Brázda, O. Kaman, T. Kmječ, D. Kubániová   |
| 16:00 - 16:30 Coffee break         |               |   |
| 16:30 - 19:00<br>chair: M. Mašláš  | 16:30 - 17:00 | <b>Nanoparticles of alpha-Fe precipitated from Cu-Fe alloy</b><br><u>M. Cesnek</u> , O. Milkovič, T. Kmječ, J. Kohout, M. Miglierini  |
|                                    | 17:00 - 17:30 | <b>Thermally induced transformations of iron(iii) oxide polymorphs in various atmospheres</b><br><u>J. Havlakova</u> , J. Tucek, J. Kaslik, O. Malina, I. Medrik, R. Zboril   |
|                                    | 17:30 - 18:00 | <b>Preparation of magnetite powder by thermal decomposition of ferrous oxalate in the combined atmosphere of inert and conversion gases</b><br><u>J. Kopp</u> , P. Novák, J. Kašlík, J. Pechoušek   |
|                                    | 18:00 - 18:30 | <b>Creation of nanocrystalline alloys after Cu ions implantation in amorphous precursors</b><br>J. Sitek, <u>D. Holková</u> , J. Dekan, P. Novák, J. Dobrovodský  |
|                                    | 18:30 - 18:45 | <b>Copper ferrite: hyperfine interactions of <sup>57</sup>Fe nuclei and distribution of cations</b><br><u>J. Kohout</u> , T. Kmječ, J. Plocek, P. Bezdička, K. Závěta   |

WEDNESDAY, JUNE 27, 2018

|                                    |               |   |
|------------------------------------|---------------|---|
| 9:00 - 10:45<br>chair: M. Oshtrakh | 9:00 - 9:45   | <b>Past, present and future of Mössbauer spectrometer designs</b><br><u>M. Mashlan</u>  |
|                                    | 9:45 - 10:15  | <b>Iron zeolites for high temperature N<sub>2</sub>O decomposition</b><br>E. Tabor, G. Sádovská, M. Bernauer, P. Sazama, <u>T. Kmječ</u> , J. Kohout, K. Závěta, Z. Sobalík |
|                                    | 10:15 - 10:45 | <b>Comparison of iron bearing minerals from regions of Boda Claystone Formation: variations in genesis</b><br><u>K. Lázár</u> , Z. Máthé                                    |

10:45 - 11:15 Coffee break

|                                 |               |  |
|---------------------------------|---------------|--|
| 11:15 - 13:00<br>chair: K Lázár | 11:15 - 11:45 | <b>Synchrotron Mössbauer spectroscopy unveils the properties of a monolayer of single molecule magnets deposited on gold</b><br><u>A. Cini</u> , M. Mannini, A. Cornia, M. Fittipaldi, G. Spina, F. Totti, A. I. Chumakov, R. Rüffer, R. Sessoli |
|                                 | 11:45 - 12:15 | <b>The effects of Xe swift ion bombardment on the amorphous structure of a vitroperm type alloy</b><br><u>S. Michalik</u> , M. Cesnek, M. Pavlovic, M. Miglierini, M. Drakopoulos  |
|                                 | 12:15 - 12:45 | <b>Identification of spatially localised inhomogeneities in metallic glasses by in-situ nuclear forward scattering</b><br><u>V. Vrba</u> , V. Procházka, M. Miglierini   |
|                                 | 12:45 - 13:00 | <b>Microstructure of steels for nuclear facilities</b><br><u>L. Pašteka</u> , M. Miglierini, T. Kmječ, M. Štefánik, M. Bujdoš  |

13:00 - 14:30 Lunch

14:30 - 18:30 **Excursion**

19:00 - 23:00 **Conference dinner**

THURSDAY, JUNE 28, 2018

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|---------------------------------------|-----------------------------|--|
| 9:00 - 10:45<br>chair: N. Chistyakova | 9:00 - 9:45<br><b>PL 05</b> | <b><sup>119</sup>Sn and <sup>57</sup>Fe Mössbauer studies of visible-light activated photocatalytic and photo-fenton reactive tin and iron silicate glasses</b><br>B. Kobzi, <u>S. Kubuki</u> , E. Kuzmann, K. Sinkó, Z. Homonnay, S. Krehula, M. Ristić, S. Musić, T. Nishida                       |
|                                       | 9:45 - 10:15                | <b>Low dimensionality in divalent tin-containing materials and its study by X-ray diffraction and <sup>119</sup>Sn Mössbauer spectroscopy</b><br><u>G. Dénès</u> , M.C. Madamba, A. Muntasar, K. Tam, H. Merazig   |
|                                       | 10:15 - 10:45               | <b>Microstructure and magnetic behavior of coherent A2 + L2<sub>1</sub> Fe-Al-Ti</b><br><u>Y. Jiraskova</u> , N. Pizurova, M. Friak, D. Janickovic   |
| 10:45 - 11:15 Coffee break            |                             |  |
| 11:15 - 13:00<br>chair: G. Dénès      | 11:15 - 11:45               | <b><sup>197</sup>Au Mössbauer study of nanosized Au-Cu/Al<sub>2</sub>O<sub>3</sub> bimetallic catalysts</b><br><u>S. Stichleutner</u> , A. Beck, G. Nagy, D.F. Srankó, Gy. Sáfrán, F. Schmidt, K. Lázár  |
|                                       | 11:45 - 12:15               | <b>Mössbauer investigations of iron states in products from the arc synthesis of Fe-carbon nanoclusters</b><br><u>V. G. Semenov</u> , V. V. Panchuk, V. S. Kozlov  |
|                                       | 12:15 - 12:45               | <b>Martensitic transformation in ferromagnetic shape memory alloys studied by Mossbauer spectroscopy</b><br><u>O. Heczko</u>   |
| 12:45 - 14:00 Lunch                   |                             |  |
| 14:30 - 16:00<br>chair: O. Heczko     | 14:00 - 14:30               | <b>The dynamical behavior of <sup>57</sup>Fe probe nuclei in layered perovskites La<sub>2</sub>Li<sub>0.5</sub>M<sub>0.5</sub>O<sub>4</sub> (M = Co, Ni, Cu)</b><br><u>I.S. Glazkova</u> , A.V. Sobolev, V.S. Rusakov, A.S. Moskvina, I.A. Presniakov  |
|                                       | 14:30 - 15:00               | <b>Magnetic structures of the Fe<sub>3</sub>PO<sub>7</sub> and Fe<sub>7</sub>(PO<sub>4</sub>)<sub>6</sub> investigated by <sup>57</sup>Fe Mössbauer spectroscopy</b><br><u>A.V. Sobolev</u> , A.A. Akulenko, I.S. Glazkova, A.A. Belik, T. Furubayashi, I.A. Presniakov                              |
|                                       | 0,420833333                 | <b>Mössbauer study of doped lithium iron phosphates: Li<sub>x</sub>Fe<sub>1-y</sub>M<sub>y</sub>PO<sub>4</sub> (M = Mg, Mn, Co, Ni, Zn)</b><br><u>S. Yaroslavtsev</u> , N. Vostrov, S. Novikova, A. Skundin, T. Kulova, A. Yaroslavtsev, V. Rusakov  |
| 15:30 - 16:00 Coffee break            |                             |  |
| 16:30 - 18:30<br>chair: V. Semenov    | 16:00 - 16:30               | <b>Conversion Electron Mössbauer Spectrometer operating at low and high temperatures with an Yttrium aluminium garnet: Cerium Scintillator</b><br><u>F. Linderhof</u> , M. Mášlaň  |
|                                       | 16:30 - 17:00               | <b>Preparation of pure and doped ε-Fe<sub>2</sub>O<sub>3</sub> nanoparticles by sol-gel process, structural and magnetic characterization</b><br><u>M. Tomíčková</u> , J. Tuček, M. Gich, O. Malina, R. Zbořil   |
|                                       | 17:00 - 17:30               | <b>Local crystal and magnetic structures of R<sub>2</sub>NiMnO<sub>6</sub> (R = Sc, In, Tl) double perovskites: a Mössbauer study on the <sup>61</sup>Ni and <sup>57</sup>Fe nuclei</b><br><u>A.V. Sobolev</u> , A.A. Belik, I. Sergueev, A. Chumakov, A.A. Akulenko, I.S. Glazkova, I.A. Presniakov |
|                                       | 17:30 - 18:00               | <b>Mössbauer investigations of iron - containing materials for different bio-and chemical applications</b><br><u>A. Lančok</u>   |
| 18:00 - 18:15 <b>Closing Session</b>  |                             |  |