

Project Ideas

Center for Physical Sciences and Technology

Vilnius, Lithuania

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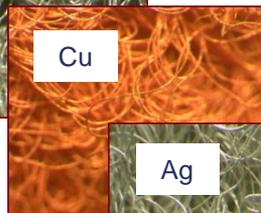
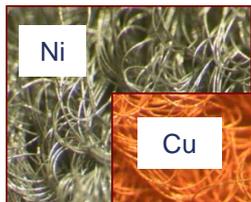
Dr. Jurga Juodkazyte

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- The largest scientific research institution in Lithuania (> 650 people)
 - Institute of Chemistry
 - Institute of Physics
 - Institute of Semiconductor Physics
 - Textile Institute



- The areas of competence of the Institute of Chemistry:
 - Functional coatings and materials (electroless deposition, electroplating, magnetron sputtering, ALD, anodizing)
 - Electrochemical material science and corrosion research (Accredited Corrosion Laboratory)
 - Spectroelectrochemistry (SERS)
 - Characterization of materials structure (XRD, SEM, TEM, XPS)
 - Tribology
 - Chemical waste treatment technologies



Flow process application in Suzuki reaction

Topic of research

- development of **new catalytic processes** based on more effective catalysts to transform manufacturing processes

Project idea concept

Suzuki reaction - synthesis of biaryls from halides and boronic acids in presence of Pd catalysts

Problems:

- ✓ removal and recycling of soluble salts and micro particles of palladium after reaction
- ✓ use of toxic solvents like toluene, dioxane etc.

What has been already done:

- We have first experimental data about possibility to perform the coupling of aryl boronic acid and aryl halide in alcohol/water solutions using immobilized Pd catalyst
- Working prototype of flow reactor for several kg scale synthesis has been designed and tested

Advantages:

- ✓ yield or reaction – up to 98% and better
- ✓ product isolation in 98% purity can be achieved
- ✓ reaction and workup requires smaller volumes
- ✓ multiple use and full recycling of palladium catalyst + partial recycling of alcohol is possible

Expected impacts of project idea:

- More convenient and greener organic processes based on Suzuki reaction
- No contamination of waste waters with palladium and its salts
- Reduced amount of catalyst
- Multiple use and easy removal of catalyst after reaction
- New process might be used in synthesis of intermediates for energy harvesting and another materials

...which lead towards:

- Improvement in cost competitiveness, lifetime and processibility as well as manufacturing capability for organic materials
- Improvement of the efficiency, quality and reliability of the product
- Better use of raw materials and resources with reduced environmental impact and to lower cost
- Increase in productivity

We are looking for partners:

Industrial and (or) research institutions interested in development of greener and more efficient organic synthesis using flow reactor and immobilised Pd catalyst for Suzuki synthesis

Coming suitable calls:

- DT-NMBP-18-2019: Materials, manufacturing processes and devices for organic and large area electronics
- DT-FoF-08-2019: Pilot lines for modular factories
- DT-FoF-09-2020: Holistic energy-efficient factory management
- DT-FoF-10-2020: Pilot lines for large-part high-precision manufacturing

Contact details for project idea

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