

Riga Technical University 62nd International Scientific Conference

“Materials Science and Applied Chemistry”

Program and Abstracts

October 22, 2021



Program

Plenary Session - <https://rtucloud1.zoom.us/j/5204285574>

- 9:50-10:00 Opening ceremony Prof. M. Turks, Dean of Faculty of Materials Science and Applied Chemistry, RTU, Latvia
Awarding of Paul Walden Prize Winner 2021
- 10:00-10:50 **Prof. Emiliano Bilotti**, Queen Mary University of London, UK
Multifunctional Polymer (Nano)Composites
- 10:50-11:10 **Prof. Māra Jure**, RTU FMSAC, Latvia
Historical Sites of Chemistry in Riga

Oral Presentation Sessions

General Materials Science

- 11:10-11:25 **Linards Lapčinskis.**
Triboelectrification of nanocomposites using identical polymers with different concentrations of nanoparticle
- 11:25-11:40 **Osvalds Verners.**
Assessment of improvement of triboelectric contact electrification of polymeric materials by surface functionalization
- 11:40-11:55 **Raivis Eglītis.**
Photochromic TiO₂ organogels
- 11:55-12:10 **Mārtiņš Randers.**
Structure and composition of alkali treated illite clay
- 12:10-12:25 **Andris Šutka.**
Antibacterial properties of brownmillerite in water disinfection
- 12:25-12:40 **Agneta Veženkova.**
Injectable, porous, osteoinductive calcium phosphate cements in patent literature
- 12:40-12:55 **Andris Ozols.**
Polarization microholograms in an azobenzene film

Polymer Materials and Composite Materials

- 11:10-11:25 **Anda Barkāne.**
Reinforcement efficiency of cellulose nanofibers and nanocrystals in UV-curable vegetable oil polymer matrix
- 11:25-11:40 **Velta Fridrihsone.**
Modification of cellulose with maleic acid anhydride in an anhydrous environment as additive for paper

- 11:40-11:55 **Sergejs Beluns.**
Lignin and Xylan addition to cellulose nanopaper - a sustainable solution to improve properties
- 11:55-12:10 **Madara Žiganova.**
Plasticization and properties of microbiologically synthesized polyhydroxyalkonate
- 12:10-12:25 **Artūrs Kīsis.**
Effect of the polyurethane adhesive and polyvinyl acetate dispersion adhesive on the strength of the construction joints in bending strength
- 12:25-12:40 **Kristaps Zvirgzds.**
Additives for hemp shive board to decrease water absorption
- 12:40-12:55 **Laimdota Vilcēna.**
Technology development for betulin integration into nano-fibers web

Chemistry of Organic Compounds

- 11:10-11:25 **Rūdolfs Beļauņiņš.**
Electrophile-induced transformations of propargyl silanes
- 11:25-11:40 **Kristaps Leškovskis.**
Aromatic substitution of azido-pyridopyrimidines and study of their azide tetrazole equilibrium
- 11:40-11:55 **Krista Gulbe.**
Sulfur dioxide-promoted glycosylation with glycosyl fluorides
- 11:55-12:10 **Armands Rudušs.**
The use of thiazoline-based carbenes for a development of metallo-organic thermally activated delayed fluorescence emitters

Clothing and Textile Technologies

- 11:10-11:25 **Solvita Bilinska.**
Fabric sewability, today's challenges
- 11:25-11:40 **Ilze Balgale.**
Multilayer woven textile switch array
- 11:40-11:55 **Liene Siliņa.**
Systematization of anthropometric characteristics of individual athletes

The MSAC poster session will be held virtually.

The posters are available: <https://msac.rtu.lv/program-2021-2/> (till October 25, 2021).

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Sulfur Dioxide-Promoted Glycosylation with Glycosyl Fluorides

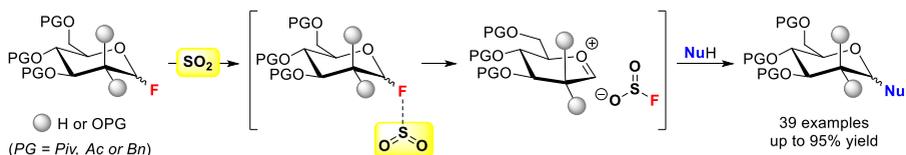
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Liquid SO₂ is a polar solvent that possesses Lewis acid properties. It is known to facilitate Lewis acid promoted and/or carbenium ion mediated chemical transformations.¹ Apart from that, SO₂ has an affinity towards fluoride ion that leads to covalent bonding in the form of relatively stable fluorosulfite anion.²

Based on the aforementioned physico-chemical properties of SO₂, we have developed sulfur dioxide-promoted glycosylation with glycosyl fluorides as glycosyl donors in liquid SO₂ without an external promoter (Scheme 1).³ The novel synthetic method was successfully applied for the synthesis of *O*-, *S*- and *C*-glycosides in moderate to excellent yields by employing benzyl- and acyl-protected manno- and glucopyranosyl fluorides, including 2-deoxyglycopyranosyl fluoride. The α/β -selectivity of glycosylation was proposed to be substrate-controlled presenting thermodynamic equilibrium. The formation of fluorosulfite species during the glycosylation in the presence of SO₂ was proved by both ¹⁹F NMR spectroscopy and DFT calculations. Additionally, it was demonstrated that saturated solutions of SO₂ in traditional solvents like DCM and toluene retain the promoting effect of SO₂ as a Lewis acid towards glycosylation with glycosyl fluorides. Such a modification of reaction conditions offers more convenient experimental procedure that does not require high-pressure stainless steel equipment.



Scheme 1. Sulfur dioxide-promoted glycosylation with glycosyl fluorides

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References

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