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Comprehensive transformation of alcohols catalyzed by *N*-halo organic compounds under green reaction conditions

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The development of protocols for the transformation of organic compounds using environmentally friendly methods while still achieving high atom economy, selectivity and efficiency is currently one of the main trends in organic synthesis. Therefore, planning organic reactions and processes following the principles of green chemistry is a major challenge in organic chemistry. As a result, high substrate concentration and solvent-free synthetic methods have attracted significant interest and have become important in organic chemistry and development, because of their simplicity and cost efficiency. Since alcohols are versatile compounds, their direct transformation under green reaction conditions would be an important process to provide useful building blocks in organic synthesis. Because of their lower leaving ability group, hydroxyl moieties are rarely substituted under mild conditions and must often be activated before treatment with nucleophiles. Numerous related methodologies have been elaborated using a sub-stoichiometric amount of Brønsted acids, metals ions, Lewis/Brønsted acid combination or other promoters which have been touched on by recent excellent reviews. Accordingly, the development of efficient, selective and environmentally benign catalytic methodologies for the comprehensive direct transformation of various alcohols for new C-C and C-heteroatom bonds formation remains an attractive research subject. A group of organic molecules bearing an active N-halogen bond: *N*-halosuccinimides (chloro, bromo or iodo, respectively), 1-chloromethyl-4-fluoro-1,4 diazoniabicyclo[2.2.2]octane bis-tetrafluoroborate (Selectfluor™ F-TEDA-BF<sub>4</sub>) and *N*-fluorobenzenesulfonimide (Accufluor™ NFSi) was introduced, tested and applied as new, efficient, metal- and acid-free catalysts for comprehensive direct transformation of alcohols. The type of transformation, thus forming new C-C or C-heteroatom bonds in starting alcohol material, was found to depend on the presence and structure of different organic molecules acting as sources of corresponding nucleophile species. The reactions were efficiently and selectively performed under solvent-free reaction conditions (SFRC) or under high substrate concentration reaction conditions (HCRC), enhancing the green chemical profiles of these transformations.

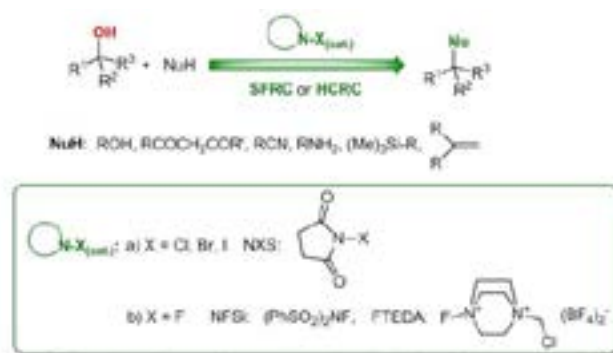


Figure 1: General concept and work-plan of the research.

## Biography

Njomza Ajvazi has worked as an Assistant Teacher of General Chemistry courses at the University of Pristina, Kosovo. Her Doctor of Science degree was conferred by Jožef Stefan International Postgraduate School, Ljubljana, Slovenia in June 2016. She graduated from the Laboratory of Professor Dr. Stavber with PhD thesis describing her research on development of new methodologies for comprehensive direct transformation of alcohols in a way and under reaction conditions, which follow principles of green chemistry, especially those principles that include catalytically supported transformations under solvent-free reaction conditions, under high concentration reaction conditions or in aqueous media. Following this scientifically important aim, she discovered, tested and comprehensively applied new type of catalysts from the family of *N*-halo organic compounds which in sub-stoichiometric amounts selectively and efficiently support transformation of alcohols, thus forming new C-C or C-heteroatom bonds through the nucleophilic substitution type of reaction.

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