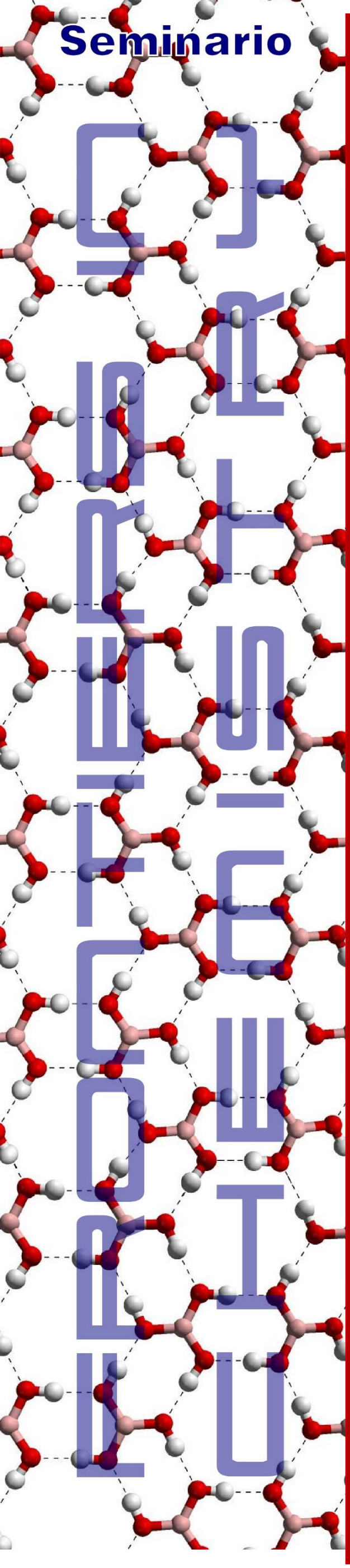

Università degli Studi di Padova
Dipartimento di Scienze Chimiche

Ciclo di Seminari 'Frontiers in Chemistry'

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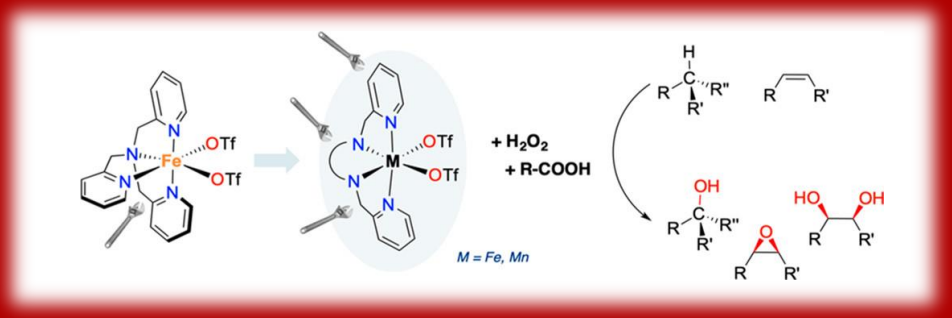
Pursuing Selectivity in Biologically Inspired Oxidation Reactions

Mercoledì 22 Maggio 2024, ore 15.30

Selective oxidation of unactivated C–H bonds constitutes a potentially very useful reaction because it introduces functionality in otherwise inert hydrocarbon based skeletons.[1]



However, the differentiation among multiple C–H bonds with powerful oxidizing agents and predictability in site selectivity are often unsurmountable problems that prevent the widespread incorporation of these reactions in synthetic planning. Another critical issue is represented by product chemoselectivity because the first formed products are generally more susceptible to oxidation than the starting substrate, and they are thus overoxidized or obtained in relatively low yield.[2]
Our research efforts have been placed in the design of metal catalysts based in iron and manganese coordination complexes that can mimick basic aspects of the reaction mechanisms operating in nonheme iron dependent oxidation enzymes. These complexes react with hydrogen peroxide producing high-valent metal-oxo species, which are powerful oxidants and can perform the oxidation of alkanes, alkenes and arenes in a chemoselective manner under mild experimental conditions. Manipulation of the first and second coordination sphere of the catalysts enables to regulate the mechanisms of O-O cleavage, modulate the chemo and site selectivity in catalytic oxidations, and elicit highly enantioselective transformations.[3]

[1] T. Newhouse, P. S. Baran, Angew. Chem., Int. Ed. 2011, 50, 3362–3374
[2] M. Milan, M. Salamone, M. Costas, M. Bietti, Acc. Chem, Res. 2018, 51, 1984–1995.
[3] L. Vicens, G. Olivo, M. Costas, ACS Catal. 2020, 10(15), 8611–8631

La presenza della S. V. sarà molto gradita.

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UNIVERSITÀ DEGLI STUDI DI PADOVA

Corso di Dottorato in Scienze Molecolari

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