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New Approach for direct Fluoroalkylation: Toward the Synthesis of Bio-active Drugs

The introduction of fluorine/ fluorinated groups constitute a « hot topic » in modern organic chemistry. Today, up to 40 % of all active drugs in pharmaceutical industry feature at least one fluorine atom. Among the fluorinated groups, the trifluoromethyl motif is recognized to pervade all aspects of chemical research. For more than a century, efforts have been made to enhance the accessibility of the trifluoromethyl group. In the course of this period, research into new trifluoromethylating reagents has grown and evolved in remarkable ways. Among those the Ruppert-Prakash reagent (CF_3TMS) is by far the most used one. However, the manufacture of CF_3TMS incorporates ozone-depleting chemicals. To overcome this drawback we aim to develop a new environmentally friendly concept. The first phase of the project relies on the use of pure organic chemistry. The second phase involves more fundamental research applying transition metal catalysis. Both parts are complementary and target a substantial contribution to a more responsible way of conducting already known transformations. Once the concept established, the synthesis of bio-active drug analogs will be undertaken.

The establishment of such a concept will enable exceptional and highly sustainable fluoroalkylation reactions. Moreover, it constitutes a breakthrough in fluorine chemistry with respect to protecting and preserving the environment and will definitely pave the way to industrial applications.

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