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## Catalytic and photocatalytic formation of C(sp<sup>3</sup>) - F bonds with heterogeneous catalysts

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The increasing demand for fluorinated compounds, widely employed in several industrial fields, has led to a surge of interest regarding the development of new strategies to perform selective fluorination reactions. However, whilst several breakthroughs have been achieved, the selective formation of C(sp<sup>3</sup>)-F bonds remains an elusive target. Furthermore despite the many advantages offered by heterogeneous catalysts, the development of an active and stable heterogeneous catalyst for such processes represents an even greater challenge, due to the harsh reaction conditions typically employed in these reactions. Recently our group has demonstrated that active and stable heterogeneous catalysts can be employed to perform selective and efficient fluorination reactions. Firstly, we reported that cationic Ag, supported on TiO<sub>2</sub> by mechanochemical synthesis, is an efficient heterogeneous catalyst for the selective formation of new C(sp<sup>3</sup>)-F bonds *via* the decarboxylative fluorination of aliphatic carboxylic acid. More recently, and in parallel with this finding, we also developed new photocatalytic methods for the formation of new C(sp<sup>3</sup>)-F bonds, which employ commercially available TiO<sub>2</sub> as heterogeneous photocatalyst, and display improved levels of sustainability and efficiency relative to all previous fluorination methods. During this presentation, our most recent findings regarding the selective formation of C(sp<sup>3</sup>)-F bonds *via* photofluorination with TiO<sub>2</sub> will be discussed. In addition to kinetic and mechanistic studies, detailed spectroscopic studies with DRIFT, 19F MAS NMR and XPS will also be discussed as these permit elucidation of the reaction steps mediated by the solid catalyst.

### Biography

Giulia Tarantino is a final year PhD student. She joined the hammond research group at cardiff university in 2015. Prior to her PhD studies, she completed her masters degree in chemical sciences at federico ii university of naples, where she was also the recipient of a one year fellowship award in organic synthesis. Ceri Hammond is a royal society university research fellow, based primarily at the Cardiff Catalysis Institute. Prior to establishing his independent group, he spent periods at ETH Zürich (11-14) and stanford university (14-15). His group currently consists of 1 PDRA, 8 PhDs and several undergraduate students.

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