Organic Synthesis in Water Mediated By Silyl Radicals

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### Abstract:

This account is focused on highlighting the recent advances on synthetically-useful organic reactions employing siliconcentered radicals in water, and presenting new reactions in water, mediated by silyl radicals. In doing so, several types of organic radical transformations will be discussed, such as reduction of organic halides utilizing non toxic organosilane reducing agents in water, transformation of azides into amines, synthesis of protecting silyl ethers in water, hydrosilylation reactions of carbon-carbon double and triple bonds, and radical cyclization reactions in water induced by silicon-centered radicals. More recently, intermolecular radical carboncarbon bond formation reactions mediated by silyl radicals have allowed the synthesis of perfluoroalkyl-substituted compounds in water, widening the scope for the syntheses of fluorophoes. These silicon radical-mediated chain reactions in water are initiated through different methods, among which, thermal, photochemical, and dioxygen initiations are reported to be the most successful methods in water. A versatile aspect of the radical methodology employed in water will be presented in terms of dealing with water-soluble and organic solvent- soluble substrates in these silicon radical-mediated reactions in water. In this regard, for an efficient chain process to take place in water, a chain carrier must be used when water-soluble substrates are employed, whereas organic solvent-soluble materials do not require a chain transporter when silyl radicals are used in water.

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