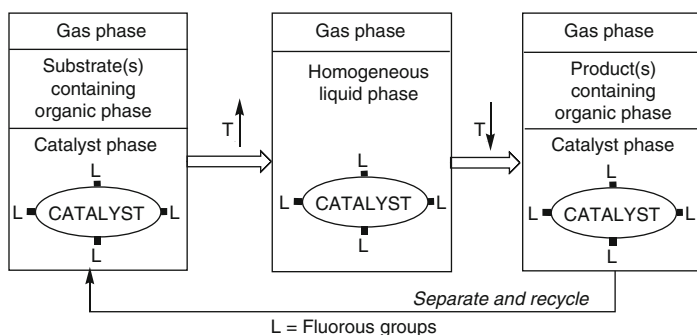


Preface

The term fluorous was introduced, as the analogue of the term aqueous, to emphasize the fact that a chemical transformation is primarily controlled by a reagent or a catalyst designed to dissolve preferentially in the fluorous phase in 1994 [1]. The strikingly similar appearance of the oil-vinegar and the methanol-perfluoromethylcyclohexane biphasic systems is obvious, though the visualization and use of fluorous systems required the synthesis of a fluorous soluble dye [2], such as a perfluoroalkylated iron phthalocyanine, or reagents or catalysts [1].

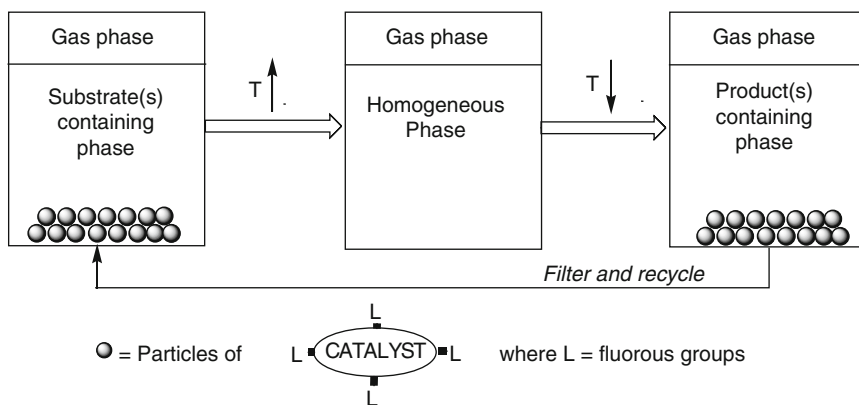


The fluorous phase was defined as the fluorocarbon (mostly perfluorinated alkanes, dialkyl ethers and trialkyl amines) rich phase of a biphasic system. It was also emphasized that perfluoroaryl groups do offer dipole-dipole interactions, making them less compatible with the fluorous biphasic concept than perfluoroalkyl groups or fluorous ponytails. The temperature dependent phase behavior of the fluorous biphasic system was not the first, but its use to control reactivity in a single liquid phase was probably the first thermoregulated homogeneous catalytic system providing reaction in one phase at higher temperature and separation of the product from the fluorous catalyst at low temperature [1].

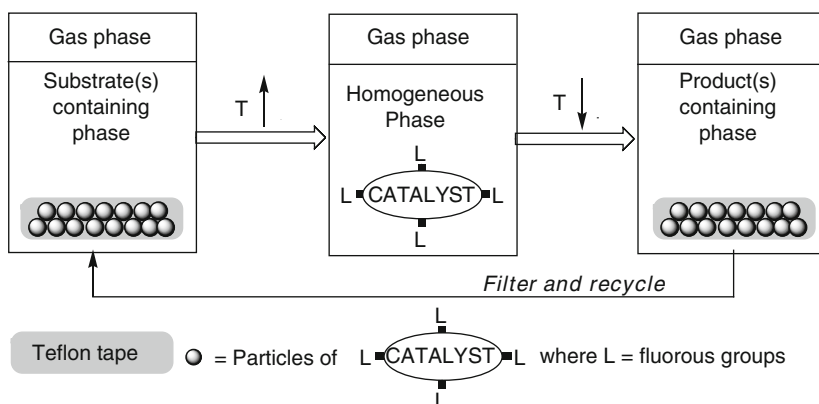


While the original definition was useful at the birth of fluorous chemistry to catch the imagination of the scientific and engineering communities, its meaning and scope have significantly changed due to novel discoveries and applications. The fluorous liquid-liquid biphasic concept was soon expanded to fluorous solid phase extraction [3] and fluorous chromatography using fluorous silica for the separation of molecules with fluorous tags [4].

The temperature regulated solubility of the fluorous compounds themselves [5, 6] has resulted in another paradigm shift by bringing the solid fluorous reagents or catalysts and the reactants into a single phase at higher temperature and offering facile separation of the product(s) at lower temperature.



The most recent advance was the introduction of the fluorous release and catch concept [7]. A fluorous catalyst, which has limited or no solubility in the reaction mixture at room temperature and entrapped in a Teflon tape, is released to the reaction mixture at higher temperature, where it acts as a homogeneous catalyst. When the reaction is completed, the reaction mixture is cooled back to room temperature during which the fluorous catalyst returns to the Teflon tape.



The publication of the Handbook of Fluorous Chemistry in 2004 [8] was followed by the first International Symposium of Fluorous Technologies (ISoFT'05) in Bordeaux, France in 2005. After two additional meetings, ISoFT'07 in Yokohama-Kamakura, Japan in 2007 and ISoFT'09 (as part of the 19th International Symposium on Fluorine Chemistry), in Jackson Hole, Wyoming, USA in 2009, ISoFT'11 will be held in Hong Kong in 2011. The current volume of Topics in Current Chemistry on Fluorous Chemistry is dedicated to ISoFT'11 and contains a broad range of articles addressing the synthesis, characterization, and applications of fluorous compounds in chemistry, material science, and biology.

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