Design and testing of innovative partially fluorinated materials for stone conservation

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Stone artworks conservation is still a challenge for conservators and scientists. The use of fluorinated compounds as protective agents for stone surfaces against water uptake started in the '80s of the last century. Due to the high chemical and photo-oxidative stability of the C-F bond, perfluopolyethers and their derivatives were firstly used to give hydrophobic properties to calcareous and siliceous stone artifacts. Later on, modifications to the original compounds have been studied and made in order to have solubility in non toxic and environmental friendly solvents, without changing the high chemical and photo-oxidative stability. Recently, partially fluorinated oligoamides have been designed, synthesized and tested on highly and low porous stones arriving to obtain super-hydrophobic surfaces with very low amount of applied product. Moreover, the stone coated with these compounds maintains its natural permeability to water vapour and chromatic features. Finally, the solubility of the products after ageing assures the reversibility of the treatment.