FLUOROPOLYMERIC ENCAPSULATION OF TITANIUM DIOXIDE INDUCED BY γ -RAYS

R. D. Chambers, Z. Chvatal, J. P. Badyal a, G. Decelles and E. Napier b

^a Department of Chemistry, University of Durham, Science Laboratories, South Road, Durham DH1 3LE, UK

^b Tioxide Group PLC, Central Laboratories, Portrack Lane, Stockton-on-Tees, Cleveland, UK

Titanium dioxide (TiO₂) is a white pigment widely used in the paints industry and encapsulation of TiO₂ particles by fluorinated polymers is highly desirable, since this would significantly hinder coagulation of pigment particles and could retard TiO₂-assisted photodegradation of the paint matrix.

We have recently found that rutile TiO₂ pigment particles suspended in the CF₂ClCFCl₂ solution of methacrylic acid and the various fluorinated monomers (CF₂=CF₂, CF₂=CH₂ and CClF=CF₂) can be encapsulated by γ -ray induced polymerisation.

The chemical character and relative thickness of these polymeric coatings has been determined by X-ray photoelectron spectroscopy (XPS). Preferential polymerisation has been shown to occur at the TiO₂/solution interface and possible mechanism will be discussed.