

Fullerene Coated Surfaces for Biomedical Applications

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We are investigating the interactions between fullerene surfaces and model proteins to explore the use of fullerenes for biomedical coatings. Temperature stabilized circulating solutions containing the proteins (e.g. BSA) flowed past the surface of a plasma resonance sensor that detected shifts in the refractive index due to protein adhesion. Different fullerenes, as well as different preparations of the fullerene surfaces were used to explore the biocompatibility of these surfaces. We are investigating the interactions between fullerene surfaces and model proteins to determine the potential use of fullerenes for biomedical coatings. Bovine serum albumin (BSA) is used as the initial model protein because its adsorption characteristics provide a simple and reliable indication of surface hemocompatibility. Our investigation consists of a buffer of temperature-stabilized protein solution flowing against the fullerene-coated surface of a plasmon resonance sensor. This sensor very accurately monitors the rate and quantity of surface protein adsorption by detecting the shift in the buffer's apparant refractive index due to protein adhesion. Surface variation is obtained through the use of modified fullerenes and the application of different surface preparation techniques; it is through consideration of such variations that a thorough investigation of the hemocompatibility of fullerene surfaces will be made.