

## XPS investigation of adsorption of albumin on polymer surface

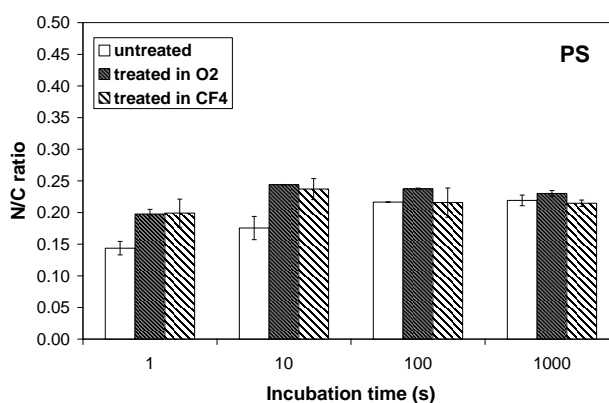
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Plasma is often used to improve biocompatibility properties of various polymer implants especially in the case of cell growth. Cells are normally kept in a protein-rich solution. Therefore, interaction of proteins with a polymer surface is an important step in adhesion of cells. The influence of surface hydrophilicity/hydrophobicity on adhesion of protein albumin to polymer polystyrene (PS) was studied. The polymer surface was made hydrophilic or hydrophobic by treatment either in an oxygen plasma or in tetrafluoromethane plasma respectively. The rate of adhesion of albumin was studied by X-ray photoelectron spectroscopy (XPS) after incubation of samples in the albumin solution for different periods ranging from 1 s to 1.000 s. Measurements of the intensity of nitrogen peak that is originating from the adsorbed protein layers for samples after different incubation showed some important conclusions. Namely, the results have shown that the adhesion of protein appears already in the 1 s of incubation. The quantity of adsorbed protein was slightly higher for both plasma treated samples than for untreated one. After 100 s of incubation this difference has disappeared. The results clearly show that proteins are the first macromolecules reaching the polymers surface, because adhesion of cells appears much later. Therefore, this adsorbed protein layer may govern further adhesion of cells.



**Figure 1:** Comparison of N/C ratio after incubation in albumin solution for untreated polystyrene samples and those treated in O<sub>2</sub> and CF<sub>4</sub> plasma.

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