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SURFACE PROPENSITY OF SMALL ORGANIC BIOMOLECULES IN VAPOUR-WATER INTERFACE BY XPS

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Abstract. Aqueous interfaces are crucial in, e.g., environmental sciences, biology, and technology. One example of this is biointerfaces, i.e., interfaces between cells, biological tissue or organic material with another biomaterial or inorganic/organic material. The structure and properties of such biointerfaces depend on the interactions between biomolecules and surfaces. A second example is the liquid−vapor interface of water, which is of tremendous importance in the atmosphere. One powerful tool to study the surface propensity of solvated molecules is X-ray photoelectron spectroscopy (XPS). This probe combines the chemical selectivity and surface sensitivity. For amino acids, XPS has previously been applied to aqueous solutions of glycine, revealing a high selectivity to the different pH-dependent charge states, see Otosson et al. 2011. Recently, it has also been shown that cysteine, in which −SH constitutes a third titratable group, exhibits different protonation states at the aqueous surface as compared to the bulk, see da Silva 2015. In this presentation, I will show XPS studies in aqueous solutions of amino acids, with different size chains and compositions, see Mocellin et al. 2017. Moreover, as the vapor phase outside the liquid effectively acts as a very hydrophobic surface, the water-vapor interface is a useful model for hydrophobic interfaces, and the results may therefore also have significance for hydrophobic biointerfaces.

References

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