MONITORING THE HYDROLISIS OF ESTER-FUNCTIONALIZED POLY(2-OXAZOLINE)S VIA ZETA-POTENTIAL MEASUREMENTS

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Poly(2-oxazoline)s are under current investigations for their possible applications in medicinal and pharmaceutical areas. The alkaline or acidic hydrolysis of ester-functionalized poly(2-oxazoline)s such as poly[methyl 3-(4,5-dihydrooxazol-2-yl)propanoate] (Figure 1) [1] offers a fast and highly reproducible way to receive carboxylic-functionalized surfaces for subsequent chemical functionalization. Upon extended reaction times during acidic hydrolysis, potentially performed as microwave assisted reactions [2], also the amide bonds are hydrolyzed yielding (protonated) polyamines [2]. Notably, the ester bond may be selective cleaved upon alkaline hydrolysis or 'mild' acidic hydrolysis. In order to monitor and optimize the process parameters and conditions, zeta-potential and contact angle measurements were used to determine the degree of hydrolysis throughout the reaction process. A clear correlation could be established, revealing the degree of hydrolysis and the type of bonds cleaved as a function of the surface energy and the isoelectric point.

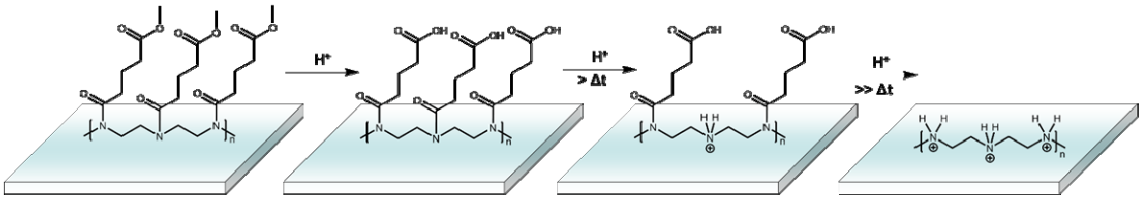

Figure 1: Schematic representation of the acidic hydrolysis of ester-functionalized films of poly(2-oxazoline)s.

[1] Fimberger, M.; Luef, K.P.; Payerl, C.; Fischer, R.C.; Stelzer, F.; Kállay, M.; Wiesbrock, F. The π-Electron Delocalization in 2-Oxazolines Revisited: Quantification and Comparison with Its Analogue in Esters. *Materials* **2015**, *8*, 5385-5397.

[2] Kelly, A.M.; Kaltenhauser, V.; Mühlbacher, I.; Rametsteiner, K.; Kren, H.; Slugovc, C.; Stelzer, F.; Wiesbrock, F. Poly(2-oxazoline)-derived Contact Biocides: Contributions to the Understanding of Antimicrobial Activity. *Macromol. Biosci.* **2013**, *13*, 116-125.