

## **ABSTRACT**

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**Title of Doctoral Thesis:** Application of nanofibrous sorbents for on-line extraction in liquid chromatography

A compilation of ten publications is presented in this dissertation thesis. It is focused on the application of nano and microfibrinous polymers as a new extracting material in analytical chemistry. This work was based on close cooperation with the Institute for Nanomaterials, Advanced Technologies and Innovation and the Department of Nonwovens and Nanofibrous Materials at the Technical University of Liberec, where the author took part in designing and preparation of these materials.

The first part deals with model studies, based on using polyamide, polystyrene and polycaprolactone nanofibers as sorbents for solid phase extraction in classical off-line mode or in on-line column switching system. It solves practical aspects such as orientation and the formation of the fibers in the extraction system, optimization of fabrication factors affecting applicability of the nanomaterials, suitable solvent systems, stability testing and reusability of the microcolumns. The comparison with commercial reversed phase silicagel monolith is also presented in this part. Complex study of testing the nano and microfibrinous polymers in extracting systems, resulting from this part is used for follow-up experimental works.

The next part is focused on the real application of nanofibrous polymers, such as determination of bisphenol A in river water [1], mycotoxin ochratoxin A in beer [2], resveratrol in red wine [3] and other bioactive substances (bisphenols, betablockers, nonsteroidal drugs and phenolic acids) in different matrices [4]. Increased stability and extraction capacity, possibility of the surface alteration, higher selectivity, lower

consumption of organics, long-term stability and reusability are presented as the advantages of the nano and microfibrinous polymers over commercial sorbents.

The final part of presented dissertation thesis is concluded with the review on the nanofibrous polymers as the extracting materials in analytical chemistry, the advances of the last decade and a tutorial dealing with application of the nanomaterials in on-line chromatography systems.