

Coated Hollow Capillaries as X-Ray Optics

Jörn Volkher Wochnowski⁽¹⁾

(1) *University of Applied Sciences, Mönkhofer Weg 239, 23562 Lübeck
Germany,*

Joern.Wochnowski@fh-luebeck.de

Hollow glass capillaries are widely used as X-Ray Optics. State of the art is to use these capillaries uncoated.^[1]

In this talk, different selected coating technologies like Chemical Vapour Deposition (CVD) in order to coat even complex hollow glass capillaries^[2] are introduced. These different coating methods are discussed intensively for the modification and functionalization of different hollow glass capillaries with High-Z-metals^[3] in order to use them as X-Ray Waveguides e.g. for analytical applications like X-Ray Optics for microanalysis. As High-Z-metals mainly d-block transition metals can be used. For this purpose, special organometallic, elementorganic or coordination compounds^[4] mainly of d-block transition metals are decomposed chemically in these capillaries. Thus, a specific tailored nanostructured surface for the respective application can be realized to guide even hard X-Rays in these hollow capillaries like optical waveguides. To achieve this objective, the right choice precursor material is highly relevant.

These innovative surface coatings, which alter the properties of the coated materials significantly, can enable the capillaries to boost up their performance for different applications in analytics. The ultimate application of these microstructured capillaries modified and functionalised by e.g. High-Z metals is their use as X-Ray Optics for different analytical applications.

These applications will also be presented and discussed intensively in this talk.

[1] K. Tsuji, J. Injuk, R. Van Grieken et al., X-Ray Spectrometry: Recent Technological Advances, John Wiley & Sons Ltd., 1st Ed., **2004**.

[2] J. Wochnowski et al., Modified multichannel structures and their production and use
Patents: WO 2008135542 (A1) 2008-11-13; WO2008EP55458 20080505;
DE 102007020800 (A1) 2008-11-06; DE 102007020800 (A1) 2011-03-03;
DE200710020800 20070503; DE102007020800 (B4); EP2152928 (A1).

[3] J. Wochnowski et al., Hollow waveguide used in medicine and in structural analysis comprises a channel structure having an inner coating with a specified thickness
Patents: DE 102007049929 (A1) 2009-04-23; DE200710049929 20071018;
DE 102007049929 (B4) 2011-05-05.

[4] J. Wochnowski et al., Surface-modified structures, useful e.g. in optical or catalytic applications, comprise substrate, e.g. of glass, silicate primary coating and secondary coating, e.g. of metal
Patents: DE 102007049930 (A1) 2009-04-23; DE200710049930 20071018;
DE 102007049930 (B4) 2011-04-28.