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# Formation of complexes between functionalized chitosan membranes and copper: a study by angle resolved XPS

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## Abstract

Chitosan is a biopolymer with potential applications in various fields. Recently, it has been used for heavy metals removal like copper, due to the presence of amino and hydroxyl groups in its structure. Chitosan membranes were crosslinked with epichlorohydrin and bisoxirano and functionalized with chelating agents, such as, iminodiacetic acid, aspartic acid and tris-(2-amino-ethyl) polyamine. These membranes were used for copper adsorption and the formed complexes were characterized. Thermal and crystalline properties of chitosan membranes were studied by TG-DCS and X-ray diffraction. Raman, XPS and FT-IR data confirmed that copper is linked to the modified chitosan membranes by the amino groups. The oxidation state of copper-chitosan membranes were also studied by angle resolved XPS, and by UV-Vis diffuse reflectance spectroscopy.

**Keywords:** Biomaterials; polymers; X-ray photo-emission spectroscopy (XPS); Raman spectroscopy and scattering; thermogravimetric analysis (TGA); chemisorption

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