

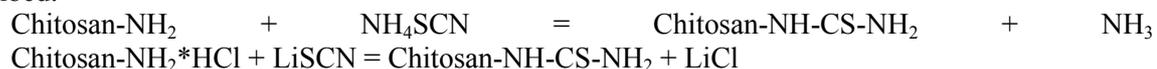
PC 12 - Thiocarbamylation of Chitosan

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The chemical modification of chitosan is a powerful tool to give it a wide range of specific functionalities. This paper concerns the thiocarbamylation of chitosan, assuming it increases sorption capacity and selectivity owing to the coordination chemistry of the grafted functional group. It is known that chitin is soluble only in special solvents, such as N,N-dimethylacetamide or N-methylpyrrolidone containing LiCl; cellulose is soluble in aqueous solutions of lithium salts. There are no data on the solubility of chitosan in solutions of lithium salts; however, chitosan solutions or chitosan gels in lithium salts provide us with a perfect medium for exchange reactions, resulting in thiocarbamylation. We have shown that chitosan solubility in aqueous solutions of lithium salts increases in order LiCl, LiBr, LiI, LiSCN; in the last three cases not only true solutions, but also gels were formed at chitosan concentration >5%.

In this paper, the direct thiocarbamylation of chitosan through reaction with LiSCN or NH₄SCN is described:



The best results in terms of degree of substitution (DS) have been obtained for the reaction performed in chitosan gel containing HCl and LiSCN. Increasing the temperature of the reaction mixture and the concentration of LiSCN increases the DS. Use of urea (rubeanic acid) does not obtain of high DS. Guibal et al. [1] showed that palladium sorption was enhanced by modification of chitosan through the grafting of sulfur compounds (such as thiourea or rubeanic acid) on a chitosan backbone using glutaraldehyde as a linker between amino group of chitosan backbone and one of the amino groups of the thiourea or rubeanic acid. We suppose that novel non-crosslinked N-thiocarbamoylchitosans synthesized in present paper will possess high sorption capacity and selectivity towards platinum group metals.