Wastewaters containing heavy metals, such as Cd, Cr, Cu, Ni, As, Pb and Zn are the most hazardous in the chemical industry. Due to their high solubility in the aquatic environment, heavy metals can be absorbed by living organisms. These wastes can also be treated as potential sources of valuable metals, therefore, cheap, efficient and selective methods to remove metals ions from waste aqueous solutions are still looking for by researchers.

Many studies on metal ions removal from aqueous solutions by ion exchange resins or modified silica have been conducted. Especially in recent years, new ion-exchange resins have been produced, from which the most popular are materials interacting selectively with metals ions. Unfortunately, limitations of these materials have also been observed, for example, a very low sorption rate. In recent years, ionic liquids have been immobilized onto silica or polymeric supports and in order to take advantage of the chemical functionality that ionic liquids can impart and, as a result, new groups of stationary phases with different fields of application in different extraction techniques have emerged. Unfortunately, their application in the metals sorption is limited, because of their low selectivity.

Our recent studies have also indicated that quaternary salts of pyridineketoxime (also having character of Ionic Liquids) can be applied as an effective and selective extractant of Cu, Zn Pb and others metals ions, even from concentrated acidic solutions. Moreover, using these compounds the metals complexation is fast, regeneration is easy, and very high stability of the extractants makes them the most attractive.

The results obtained so far, demonstrating the high potential of these compounds prompted our research group to initiate a study on using of pyridinium derivatives with extractive properties in metals sorption. The subject is new and the proposed materials have not been studied so far, but the preliminary studies enable us to expect that the presence in the sorbent structure both pyridinium cation and the hydrophobic oxime, etheroxime, ketone or amidoxime group will demonstrate a special ability to coordinate and next to remove Cu, Co, Ni, Zn, Cd, Pb, Mo, V and Cr ions from aqueous solutions.