



## Studies on di-nonyl phenyl phosphoric acid (DNPPA): a potential extractant for uranium recovery from merchant grade phosphoric acid (MGA)

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### ABSTRACT

Methods of purification of di-nonyl phenyl phosphoric acid (DNPPA), its solubility in different aqueous solutions and its recovery from acidic as well as alkaline solutions employing various diluents have been described. Liquid-solid separation method based on Nd-DNPPA salt precipitation route as well as by liquid-liquid separation based on mono ethylene glycol treatment has been studied for the purification of DNPPA. While the purity obtained in the two methods was >94%, the recovery in Nd-DNPPA salt method was only 50% as compared to 90% in mono ethylene glycol method. The solubility of DNPPA in aqueous streams like WPA (5.6 M), MGA (12 M), sulphuric acid (5.4 M), phosphoric acid (5.5 M), oxalic acid (0.95 M), sodium carbonate (1.13 M), water etc. has been determined. Recovery of DNPPA from aqueous phase was investigated employing various diluents such as petrofin, benzene, toluene, MIBK, iso-decanol, 1-octanol, etc. The effects of process variables such as phase ratio (O/A), pH, DNPPA concentration in aqueous solution on its recovery have also been studied. Solubility and recovery of TOPO has also been examined under comparable experimental conditions. A four-stage counter current diluent extraction operation at an internal reflux ratio of 20 yielded ~92% recovery for both DNPPA and TOPO from MGA employing petrofin as diluent.

*Keywords:* Solubility; Recovery; DNPPA; TOPO; MGA; Counter current diluents extraction; Petrofin

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