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STUDIES ON THE IMPROVEMENT OF WATER SOFTENING  
PROPERTIES OF A RESIN

A PROJECT REPORT

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by

P. JAYANETTI

Department of Chemistry  
University of Colombo  
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ABSTRACT

A large amount of cation-exchanger used in the boiler water purification plant of the Ceylon Steel Corporation was found to be inactive. This project is an attempt to regenerate the above exchanger ( hereafter called the "Supercoal").

The sodium capacity was measured using increasing concentrations of NaCl, and was compared with the sodium capacity of the strong cation exchanger, ambelite IRC 120. It was found that the "Supercoal" <sup>has</sup> a negligible capacity for sodium.

Then the capacity of the "Supercoal" for iron (III) ions was measured and compared with that of ambelite IRC-120. Capacity for ferric iron was also found to be almost zero. The resin was then shaken with acid, washed, and capacity for Fe<sup>III</sup> was determined. Zero capacity even after washing with acid showed that the "Supercoal" was not an iron exchanger.

The "Supercoal" was then suspected to have adsorbent properties, and was impregnated with various ligands and was tested for iron-exchange capacity. These impregnations were compared with the impregnation of the commercial adsorbent, ambelite XAD-2.

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EDTA, OXINE and N-BEHA did not show significant absorption. The ligand (LPHA) with long carbon chain showed considerable absorption. The capacity of the resin impregnated with LPHA was found for varying times of equilibration with  $\text{Fe}^{\text{III}}$  solution (pH = 2.5). 45 minutes of agitation was found to give maximum exchange.

It was concluded that the "Supercoal" can be used for water softening after impregnation with a ligand having a long hydrocarbon chain and selective for calcium and magnesium ions.

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