Nitrate Effluent Treatment in Combination of Conventional and Electrochemical Processes

Steve Resbeut,[1] Anna Velin[1] and Anders Warlin[1]

[1]Vattenfall Utveckling AB
Jaemtlandsgatan 99
Stockholm, SE 162 87
Sweden

Electrochemical reduction of nitrate removed and concentrated from ground waters or from industrial effluents has been investigated on Cu, Ni plate, Ni mesh electrodes in a divided electrochemical cell at moderate 4-8 kA/m2 current densities with high - 85-100combination of two processes: nitrate removal/concentration processes ED, IE, or by IE assisted ED and nitrate reduction - has been designed, constructed and operated in semi-pilot level with zero waste discharge in a closed loop system.

The nitrate concentration resulted from IE was at least 0.2M in sodium hydroxide of 0.3-0.36 M. The current efficiency was between 39-78on copper electrode direct reduction electronation/protonation was the main part of the nitrate reduction; on high surface nickel mesh the possibility that an electrocatalytic step is involved in the reduction mechanism could be demonstrated.