

EFFICIENT REMOVAL OF PERCHLORATE (ClO₄⁻) FROM CONTAMINATED WATER BY HIGHLY SELECTIVE, REGENERABLE BIFUNCTIONAL RESINS

Baohua Gu and Gilbert Brown
Oak Ridge National Laboratory
(*gubl@ornl.gov*)

Novel bifunctional anion exchange resins have been evaluated in both laboratory and field studies for selective removal of perchlorate (ClO₄⁻) from simulated and actual contaminated water. Results indicate that the bifunctional resins are highly selective toward ClO₄⁻ and perform ~5 times better than one of the best commercial nitrate-selective resins (Purolite[®] A-520E). The bifunctional resins are particularly effective in removing trace quantities of ClO₄⁻ in water to below the detection limit (~3 µg/L). A field trial demonstrates that the bifunctional resin (D-3696, made by Purolite International) is able to treat ~110,000 bed volumes of water before a 10% breakthrough of ClO₄⁻ occurs (running at ~2 bed volumes per minute with an initial ClO₄⁻ concentration of ~50 µg/L). Additionally, innovative regeneration technologies have been developed for anion exchange resins sorbed with ClO₄⁻ (patent pending). The new regeneration method offers a surprisingly effective means to regenerate the spent resins, and the process minimizes the operational costs and the secondary waste generation.