Ion Exchange (IX) for Boron Removal

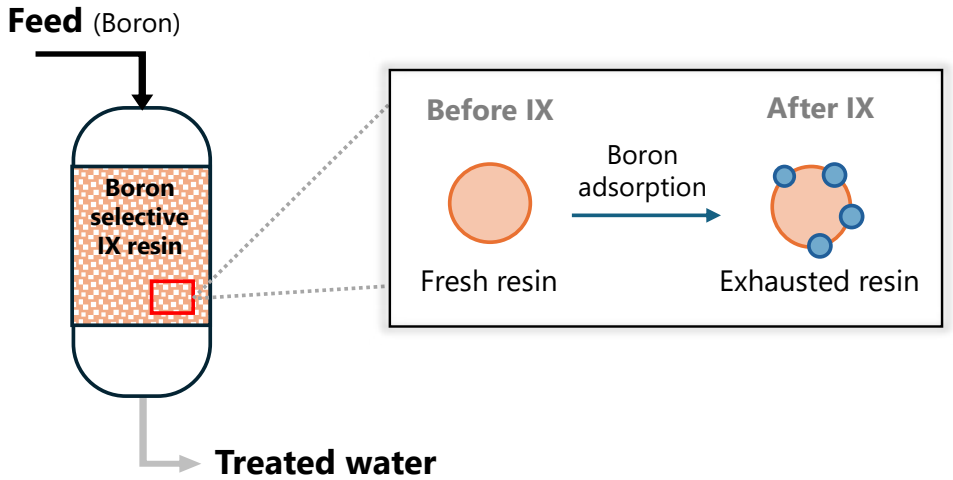
Process Description

IX is a reversible chemical process in which dissolved ions in the feedwater are selectively exchanged with ions attached to an ion exchange resin.

For boron removal, conventional anion exchange resins typically require elevated pH to convert boric acid into negatively charged borate ions that can be exchanged. In contrast, boron-selective resins containing N-methylglucamine functional groups can selectively bind boric acid and borate species, enabling effective boron removal over a wider pH range without extensive pH adjustment.

During operation, boron is adsorbed onto the boron-selective (N-methylglucamine) resin. Once exhausted, the resin is regenerated using acid and caustic solutions, restoring its capacity for repeated use. Compared with precipitation-based processes, IX systems typically require a smaller footprint, generate minimal sludge, and achieve high boron removal, making them well suited for water polishing and reuse applications.

Process Schematic



Publications

Application of emerging ion exchange resin for boron removal from saline groundwater (Link)

For further information, please contact us at email: GWSC@conocophillips.com