

Iodine Production

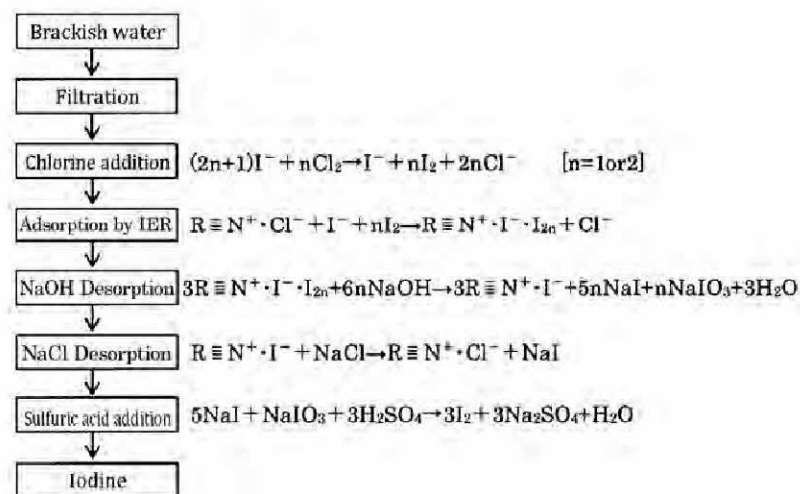
(Extracted from the Diaion Manuals pages 252 to 254)

industries. Japan produces about 40% of iodine consumed worldwide, and the majority of it is extracted from underground brackish water in the natural gas wells in Chiba prefecture.

Iodine exists in underground brackish water as sodium iodide, and it is collected by three kinds of methods: the activated carbon, the blowing-out and the ion exchange methods.

The activated carbon method: Sodium iodide is oxidized in sulfuric acid to free iodine, and the free iodine is collected by adsorption with activated carbons. Iodine absorbed by A/C is desorbed as sodium iodide by heating in NaOH solution.

The blowing-out method: Iodide ion is oxidized by chlorine and liberated iodine gas is introduced into an adsorbing tower with a large amount of air. Iodine is collected by absorption with sulfurous acid solutions and then is precipitated as iodine and collected after oxidizing with chlorine.



[Fig. VII-14-1] Iodine Recovery with SBAER:
(NaOH/ NaCl desorption)

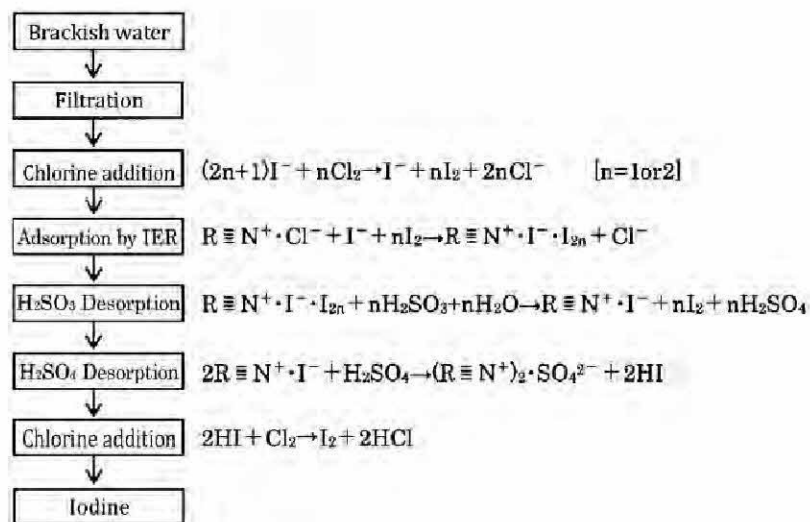
14. Manufacturing of Iodine

Iodine is one of the indispensable and important elements to humans. It is widely and highly utilized not only as roentgen contrast medium and pharmaceuticals but also in high-technology, agriculture, and food

The ion exchange method: Iodine or sodium iodide is oxidized by chlorine into poly-iodide anion and the poly-iodide anion is ion-exchanged

with IERs. Brackish water with free iodine is treated by IER towers with upflow. The IERs saturated with iodine are removed and transferred to the desorption tower, and then finally iodine is desorbed. The raw solutions are oxidized by chlorine or hypochlorite to generate molecular I_2 and I_4 , which are mixed with iodide ion I^- and change into poly-iodide anions, $I^- \cdot I_2$, $I^- \cdot I_4$ that can be adsorbed by SBAER, NSA100. The IERs that adsorb iodine enough are then removed and transferred to the desorption tower and regenerated. Desorption of iodine from IERs is done by the following two methods: one is the NaOH/NaCl desorption method in Fig.VII-14-1 and the other is the sulfurous acid/ sulfuric acid desorption method⁽⁶⁴⁾ in Fig.VII-14-2. Iodine in desorption solutions is precipitated and collected after oxidation.

Since brackish water holds humin, such humin is also adsorbed by IERs. DIAION® NSA100, an SBAER, is developed for the iodine collecting/recovery, and has good strength and resistance against organic contaminants.



[Fig. VII-14-2] Iodine Recovery with SBAER:
(Sulfurous acid/ sulfuric acid desorption)