3. Treatments of Molybdenum waste waters

Reviewing the Environmental Quality Standards for Water Pollution concerning water pollutions, molybdenum is designated to be one of the monitoring substances. Its guide concentration is below 0.07 mg/L at present, and its emission may be regulated in the near future.

Molybdenum, one of the 6A metal family as well as chromium, has become used, instead of chromium, for anti-corrosion use in cooling waters as passivation agents to form oxide film, because chromium that had been widely used as anti-corrosion agents in cooling waters since old days is not in use from the environmental point of view. Molybdenum should be removed from the spent cooling waters that contain molybdates as anti-corrosion agents, if the emission regulation of molybdenum commences.

[Table VI-3-1] Treatment of Molybdenum Waste water[29]

		Operation example			
		WA30 1L			
Molybdenum Concentration in cooling water (mg/L)		10.6			
pH		1.5	2.5	5.7	8.5
IERs		DIAION® WA30			
Molybdenum	after 30L-flow	0.03	0.01	0.03	0.05
concentration	after 50L-flow	0.05	0.03	0.03	0.05
in treated	after 60L-flow	0.05	0.03	0.05	0.07
water	after 80L-flow	0.07	0.06	0.07	
(mg/L)	after 90L-flow		0.07		
	after 100L-flow				
Cooling water	Total flow (L)	80	90	80	60
Recovery	Recovered volume (L)	0.9			
	Concentration (g/L)	1.0			
	Recovery ratio (%)	94.3			

Molybdates can be adsorbed by SBAERs such as DIAION® WA30 at pH of 1.0 ~ 8.0. Molybdenum compounds recovered from the SBAERs by the contacts with alkaline solutions, pH of which is above 9.0, can be reused as anti-corrosion agents. Table VI-3-1 demonstrates such an example. [29] Molybdenum is reported to be adsorbed by CRB02, which is one of boric acid selective adsorbing resins not on commercial and CRB03 is the substitute of which. This adsorption is derived from the anion-exchanging with oxoacids not from the complex formation as boron, since the adsorption is maximized in acidic conditions. [30]