

## Ecotoxicities evaluation of antifouling agents application for lithium adsorbents in seawater

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For recovery of lithium from seawater, the lithium adsorbent material have been developed by Korea Institute of Geoscience and Mineral Resources (KIGAM). During the field application of this adsorbent, biofouling were observed and increase the fouling amount as longer exposure time. It is important to prevent biofouling on the surface of adsorbents to maximize the lithium recovery efficiency [1]. We selected two types anti-fouling agents for reservoirs which were packing materials of lithium adsorbents. The adsorbents packed into polyurethane sponge and installed PVC frame for field experiments and anti-fouling paint and spray were applied for PVC frame (anti-fouling paint) and urethane sponge (anti-fouling spray). When lithium adsorbents were immersing to seawater, the factors that affect the ecological impact by anti-fouling agent in marine environment should be consider. In this study, eco-toxicological assessment was performed with Microtox using bioluminescence bacteria *Vibrio fischeri* [2]. Dissolution experiments were carried out to verify the acute toxicity of lithium adsorbents and anti-fouling agents. The adsorbents and its reservoirs coated with antifouling agents were soaked in sterilized seawater and aeration for 1, 3, 5, 7, 10 and 14 days intervals under controlled temperature. As the results, toxicities of adsorbents were found in more than 10 days exposure and EC<sub>50</sub> concentrations were 61.4%. Toxicity of elution by anti-fouling spray were represented relatively low as was 36.74% (10 days) to 96.27% (1 day) EC<sub>50</sub> range. However, dissolution matters from anti-fouling paint have relatively high toxicities with 10.32% to 38.23% of EC<sub>50</sub> concentrations regardless of exposing time. We also determined the concentration of heavy metals related with toxicities such as As, Cd, Cr, Cu, Zn, As, Sn, and Pb using ICP-MS.

[1] Kim *et al* (2013) *E G & H*, **35**, 311-315. [2] Backhaus *et al* (1997) *Chemosphere*, **35**(12), 2925-2938.