

Pyridine-carboxylic acid surface-functionalized on magnetite for recovery of Co(II) from aqueous solution

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Surface-immobilized pyridine-carboxylic acid on silica-coated magnetite was prepared for Co(II) recovery in water. The adsorbent achieved maximum capacity of 97.51 mg g⁻¹ at optimum pH. Adsorption-desorption runs demonstrate 94% desorption efficiency in each cycle. Treatment of simulated lithium-ion battery leachate containing Li(I), Mn(II), and Co(II) reveal the selectivity of the adsorbent with $K_{D(Co)} = 1.88 \text{ L g}^{-1}$, $\alpha(\text{Co/Li}) = 160.41$, and $\alpha(\text{Co/Mn}) = 54.48$. The adsorbent was characterized to elucidate its binding mechanism towards Co(II). This study was supported by NRF funded by The Ministry of Science and ICT (2017R1A2B2002109 and 2020R1A2C1003560), Ministry of Education (2020R1A6A1A03038817), and by KETEP funded by the Ministry of Trade, Industry & Energy (MOTIE No. 20194010201750).

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