

Possibility of sorption-enhanced leaching

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Electronic waste (E-waste) contain a variety of precious metals. However, leaching for recovery of metals generally causes serious environmental issues due to the toxicity of leachants (e.g., cyanide). As the use of less toxic leaching agents (green leachants) results in low leaching efficiency, the leaching efficiency should be enhanced. In this study, we hypothesize that if target metals are leached and adsorbed simultaneously, the leaching efficiency can be enhanced by decreasing the amount of the metals in leachates. To test this possibility, ion-exchange resins, i.e., cation exchange resin (CER) or anion exchange resin (AER), and waste printed circuit boards (WPCBs) were used as model sorbents and E-waste respectively. Aqua regia was diluted and used as a less harmful leachant. When AmberjetTM 4200 (AER) was used, the total amount of gold was about 19% higher than the sample without sorbents, whereas the sample with Dowex HCR-W2 (CER) was enhanced about 35%. As a result, the sorption-enhanced leaching can be possible and could replace the conventional leaching methods. Furthermore, experimental results using green leachants and their possibility were also discussed.