

Development of Bacterial Biosorbent Fibers and Their Applications to Recovery of Precious Metals from Waste Solutions

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The purpose of this study is to develop powerful bacterial biosorbents able to bind such precious metal(PM)-organic complexes, to make the biosorbents as a fibrous form to be used in column processes, and to apply the developed biosorbent fibers to recovery of precious metals from actual waste solutions. The waste corynebacterium glutamicum was chemically modified with ionic polymers so that anionic PM complex could bind well to the biomass surface. The fiber form of bacterial biosorbents was used to sorb PMs from various industrial waste solutions. In case of acetic acid waste solution from Samsung-BP Chemical where ruthenium is contained, the developed biosorbent fibers showed 2.5 - 7 times higher uptake than other biosorbents. PMs as the zero-valent state could be successfully recovered through incineration of the PM-loaded biosorbents. During incineration, organic constituents of the biomass could be removed and at the same time, ionic form of PMs were reduced to zero-valent form. The purity of recovered zero-valent PMs was in the range of 94.8% to 99.6%.