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Extracting Rare Earth Elements From Catalytic Converters

The objective of this Surf project was to design a method to extract rare earth elements from the monolith of a catalytic converter. Recycling them would increase supply, make technology more renewable and lower our dependence on China. The wash coat of the monolith was scrapped off to lower concentrations of base metals. Three methods were used, Hydro-Chloric Acid and Hydrogen Peroxide, Nitric Acid and Ascorbic Acid and a combination of both. Base metals (ex. Zirconium) were extracted and rare earth metals did not dissolve in any of the solutions, however, their weight percent's increased. For example, the weight percent of Cerium increased 4X and went from 5% to 20%. Cerium Oxide alone was dissolved in the Nitric Acid and Ascorbic Acid which means it's possible for Cerium in catalytic converter. A combination of procedures one and two showed the best results and there is room for improvement. An increase in molarity of the solutions or time could greatly improve the results.