Synthesis and characterization of praseodymium acetate for use in nanotechnology

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A simple and economical chemical process to obtaining praseodymium acetate of high purity is studied. The raw material in the form of mixed rare earths carbonate comes from an industrial separation of rare earths, thorium and uranium in the Brazilian monazite. It is used the technique of strong cationic exchange resin, proper to water treatment, to the praseodymium's fractionation and it is achieved a purity of 99.9% in Pr_6O_{11} and yield greater than or equal 80%, with the elution by EDTA solution in pH controlled. The complex of EDTA-praseodymium is transformed in praseodymium oxide, subsequently the oxide is dissolved in acetic acid to obtain the praseodymium acetate. The solid salt was characterized via chemical analysis, thermal analysis, X ray diffraction and infrared spectroscopy. In summary the analytical data collected allowed to conclude that stoichiometric formula for the praseodymium acetate obtained is **$Pr(CH_3COO)_3.1.5H_2O$.** The molecular absorption spectrophotometry technique is used to monitoring the praseodymium content during the process and mass spectrometry to certification the purity of the praseodymium acetate. The typical praseodymium acetate contain the followings contaminants in micrograms per gram: Y(20), Sc (18), La (6), Ce (26), Nd (3), Sm (18), Eu (17), Gd (19), Tb (16), Dy (17), Ho (18), Er (18), Tm (16),Yb (17), Lu (17.0), Lu (17).

References

[1] Pedreira, W.R. et al., Journal of Solid State Chemistry, v.171 (1), p. 3-6, 2003

[2] Queiroz, C. A. S. et al., Journal of Brazilian Chemical Society, v. 16, p.1191-1194, 2005

[3] Queiroz, C. A. S. et al., Journal of Energy and Power Engineering 9, p. 616-621, 2015