

Accepted Manuscript

Extraction of Yttrium and Europium from Waste Cathode-Ray Tube (CRT)
Phosphor by Subcritical Water

Ella Y. Lin, Astrid Rahmawati, Jo-Hsin Ko, Jhy-Chern Liu

PII: S1383-5866(17)33162-3
DOI: <https://doi.org/10.1016/j.seppur.2017.10.004>
Reference: SEPPUR 14086

To appear in: *Separation and Purification Technology*

Received Date: 15 August 2017
Revised Date: 27 September 2017
Accepted Date: 2 October 2017

Please cite this article as: E.Y. Lin, A. Rahmawati, J-H. Ko, J-C. Liu, Extraction of Yttrium and Europium from Waste Cathode-Ray Tube (CRT) Phosphor by Subcritical Water, *Separation and Purification Technology* (2017), doi: <https://doi.org/10.1016/j.seppur.2017.10.004>

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.



Extraction of Yttrium and Europium from Waste Cathode-Ray Tube (CRT) Phosphor by Subcritical Water

Ella Y. Lin, Astrid Rahmawati, Jo-Hsin Ko, and Jhy-Chern Liu*

Department of Chemical Engineering, National Taiwan University of Science and Technology, 43 Keelung Road, Section 4, Taipei 106, Taiwan.

Abstract

The current study investigated leaching of yttrium (Y) and europium (Eu) from waste cathode ray tube (CRT) phosphor by subcritical water extraction (SWE). The leaching efficiency of Y and Eu were 28.15% and 35.92%, respectively, when using 0.5 M sulfuric acid (H_2SO_4) at 65°C within 12 h of conventional extraction, and shrinking core model could describe its kinetics. Experimental results from SWE showed it very effective and efficient. The leaching efficiency of Y and Eu was the best when using H_2SO_4 and that of Zn and Pb was the lowest compared with hydrochloric acid (HCl) and nitric acid (HNO_3). The leaching efficiency increased five folds as H_2SO_4 concentration increased from 0.1 M to 0.75 M. It is noted that leaching of Y and Eu increased significantly with temperature and reached 97.51% at 125°C using 0.75 M of H_2SO_4 . In addition, sequential extraction was conducted to assess speciation of Zn and Pb in waste CRT phosphor residue after SWE. Fractionation results revealed that SWE process transformed heavy metals to a more stable state.

Keywords: Cathode ray tube (CRT); europium (Eu); leaching; phosphor; subcritical water extraction (SWE); yttrium (Y)

* Corresponding author: liu1958@mail.ntust.edu.tw (JC Liu).

Download English Version:

<https://daneshyari.com/en/article/4989451>

Download Persian Version:

<https://daneshyari.com/article/4989451>

[Daneshyari.com](https://daneshyari.com)