INTISARI

Monasit adalah mineral fosfat sumber logam tanah jarang terbesar kedua setelah bastnaesit. Di Indonesia, pasir monasit diperoleh sebagai produk samping penambangan timah di Pulau Bangka yang mengandung 60-70% RE oksida. Beberapa penelitian mengenai pengambilan logam tanah jarang dari monasit Bangka telah dilakukan, sebagian besar penelitian tersebut menggunakan metode asam dan metode alkali pada suhu rendah.

Pada penelitian ini, dekomposisi fosfat pada monasit dilakukan dengan metode *roasting* alkali. Monasit digiling dan diayak untuk mendapatkan ukuran partikel lolos 200 mesh. Rasio NaOH/monasit divariasikan pada rasio 0,5, 0,75, 1, 1,25, 1,5 dan 1,75 (w/w). Suhu roasting juga divariasikan pada suhu 300, 400, 500, 600, and 700°C. Dekomposisi fosfat pada masing-masing suhu diukur pada interval waktu 5, 10, 40, 80, and 160 menit. Kinetika reaksi dekomposisi fosfat dipelajari berdasarkan Shrinking Core Model.

Hasil penelitian menunjukkan bahwa dekomposisi fosfat pada monasit Bangka meningkat dengan meningkatnya suhu dan rasio NaOH/monasit. Suhu optimum dekomposisi fosfat diperoleh pada suhu 600°C, sedangkan rasio NaOH/monasit optimum diperoleh pada rasio 1:1 (w/w). Berdasarkan analisis kecepatan dekomposisi fosfat berbasis model *shrinking core*, diketahui bahwa kecepatan dekomposisi fosfat memiliki kesesuaian dengan model matematis dimana langkah yang mengontrol merupakan gabungan antara difusi lapisan abu dan reaksi kimia permukaan.

Kata kunci: logam tanah jarang, monasit Bangka, metode *roasting* alkali, dekomposisi fosfat

ABSTRACT

Monazite is the second most essential naturally occurring phosphate mineral containing rare earth elements, or REE. In Indonesia, monasite sand is obtained as by product of tin mining in Bangka Island containing approximately 60-70 % RE oxide. Research about extraction of REE from monazite of Bangka has been initiated. Most studies on phosphat decomposition were on phosphate decomposition using alkaline leaching.

In this study, phosphate decomposition of Monazite from Bangka Island was conducted using alkaline roasting. Monazite sand was grinded and sieved to obtain particle size at about 200 mesh. Monazite/NaOH mass ratio was varied at 10/5, 10/7.5, 10/10, 10/12.5, 10/15, and 10/17.5 (w/w), respectively. Roasting temperature was varied at 300, 400, 500, 600, and 700°C, respectively. Phosphate decomposition at each temperature was measured at varied interval i.e. 5, 10, 40, 80, and 160 minutes, respectively. Decomposition rate was analyzed on the basis of the shrinking core model.

The results showed that phosphate decomposition of monazite from Bangka Island increased with increasing temperature and increasing NaOH mass ratio. The optimum temperature was observed at 600°C, while the optimum monazite/NaOH mass ratio was found at 10:10 (w/w). From the analysis of the decomposition rate on the basis of shrinking core model, it was found that the rate could be appropriatly expressed by the rate equation based on mixed control of diffusion through a residual layer and surface chemical reaction.

Keywords: rare earth, Bangka, monazite, alkaline roasting, phosphate decomposition