วิทยานิพนธ์

การพัฒนาวิธีเอมมาเนชันเพื่อวิเคราะห์เรเดียม-๒๒๖ ในสันแร่ด้วยเครื่องนับรังสีชนิดซินทิลเลชันในของเหลว

นางสาวศุภลักษณ์ สิงห์น้อย

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DEVELOPMENT OF AN EMANATION METHOD FOR THE DETERMINATION OF RADIUM-226 IN ORES USING LIQUID SCINTILLATION

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หัวข้อวิทยานิพนธ์	การพัฒนาวิธีเอมมาเนชันเพื่อวิเคราะห์เรเดียม-๒๒๖ ในสินแร่ด้วยเครื่องนับรังสีชนิดซินทิลเลชันในของเหลว
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บทคัดย่อ

การพัฒนาวิธีเอมมาเนชันเพื่อวิเคราะห์หาปริมาณเรเดียม-๒๒๖ ทำโดยการไล่เรดอนออกจากสารละลายดีเอมมาเนชันของเรเดียม-๒๒๖ ด้วยก๊าซนำพา (carrier gas) เรดอนจะถูกไล่ออกมาอย่างสมบูรณ์เมื่อปริมาตรของก๊าซนำพาเป็น ๑๕ เท่าของปริมาตรสารละลายและถูกดูดซับด้วยซิลิกาเจล (silica gel) ที่อุณหภูมิผสมของไนโตรเจนเหลวและอัลกอฮอล์ จากนั้นเทซิลิกาเจลลงไปในขวดแก้วนับรังสีซึ่งบรรจุสารละลายเรืองแสงของโทลูอีนที่อุณหภูมิ ๐°ซ ประสิทธิภาพของการนับรังสีเป็น ๓.๕ ครั้งต่อนาทีต่อพิโคคูรี โดยมีค่าความแรงรังสีจากสภาพแวดล้อม (background) เป็น ๔ ครั้งต่อนาที ขีดจำกัดต่ำสุดของความแรงรังสีที่นับได้เป็น ๑ พิโคคูรี ค่ารีคอฟเวอรี (recovery yield)ของวิธีการเอมมาเนชันตรวจสอบได้จากสารมาตรฐานแร่ยูเรเนียม (NBL74 A) จาก New Brunsvick Laboratory ได้ค่าเฉลี่ยรีคอฟเวอรีเป็น ๙๙.๖๗±๐.๕๔ เปอร์เซ็นต์จากการทดสอบ ๑๐ ครั้ง แรโมนาไซด์จำนวน ๑๕ ตัวอย่างได้วิเคราะห์หาปริมาณเรเดียม-๒๒๖ โดยวิธีนี้

Thesis Title	Development of an Emanation Method for the Determination of Radium-226 in Ores Using Liquid Scintillation.
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ABSTRACT

A simple emanation method for the determination of radium-226 was developed. Radon was quantitatively removed from the de-emanation solution containing radium-226 when a total volume of carrier gas being equal to 15 times that of the de-emanation solution had been passed. The emanated radon was adsorbed on silica get at the temperature of an alcoholic slurry of liquid nitrogen. The silica gel was subsequently transferred at 0°c to a toluene-based liquid scintillator in a glass vial for counting. The counting efficiency of 3.5 $cpmPci^{-1}$ with a background count rate of 4 cpm was obtained. The detection limit was 1 Pci of radon. The recovery yield of the whole process was determined by analysing a standard uranium ore, NBL 74 A, from the New Brunsvick Laboratory. An average recovery yield of 99.67 ± 0.54 per cent was obtained from ten separate experiments. Results of the analysis for the radium-226 content in 15 monazite samples were also reported.

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