

The characteristics of uranium oxide sintered pellets from phosphate fertilizer waste as a potential resource of uranium

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Indonesia's energy demand is increasing rapidly. In order to meet the needs of electrical energy in Indonesia, the government increases the use of potential energy sources, both fossil and non-fossil energy in synergy (energy mix). Fossil energy sources come from petroleum, coal and natural gas. The non-fossil energy sources derived from hydroelectric, geothermal, biofuel, micro hydro, biomass, solar, wind and nuclear power. According to the National Energy Management Blueprint 2005-2025, the role of nuclear energy is planned to be about 2% of the total national electrical energy. Efforts were made to support the program. Some of the efforts are strengthening the domestication option of nuclear fuel industry and enhancing the sustainability of the nuclear fuel supply. Therefore, the availability of uranium resources becomes important. Indonesia has many considerable potential sources of uranium. Uranium ores are widely available in the Kalan area, West Kalimantan. Another potential source of uranium comes from phosphate fertilizer waste of Petrokimia Gresik Company. Results of previous study indicate that the uranium content in phosphate fertilizer waste of Petrokimia Gresik Company ranged from 70-100 ppm in a solution of phosphoric acid. The yellow cake which can be obtained from fertilizer waste is as much as 55.5 tons per year. Yellow cake powder derived from phosphate fertilizer waste has been successfully converted into nuclear grade UO₂ powder. This study reveals that UO₂ powder from phosphate fertilizer waste of Petrokimia Gresik Company could be used to make UO₂ sintered pellets which meet the specifications of nuclear fuel. The use of UO₂ powder from phosphate fertilizer waste would not only ensure the availability of uranium in Indonesia but also address the environmental issue.

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