

## ABSTRAK

### STUDI PERHITUNGAN LAJU REAKSI NEUTRON DALAM REAKTOR SCWR (*SUPERCRITICAL WATER REACTOR*) MODEL PERANGKAT (*ASSEMBLY*) HEKSAGONAL BERBAHAN BAKAR THORIUM

Oleh

Apriliana

Perhitungan laju reaksi fisi dan reaksi penangkapan neutron dengan dan tanpa filter menggunakan kode REACT pada program SRAC. Hasil perhitungan yang diperoleh menunjukkan nilai laju reaksi fisi dengan dan tanpa filter pada material 1 mengalami kenaikan seiring dengan peningkatan persentase pengayaan  $U^{233}$ . Nilai tertinggi laju reaksi fisi dengan filter yaitu  $5,7194 \times 10^{-2}$  reaksi/cm<sup>3</sup>s dan tanpa filter  $6,1361 \times 10^{-2}$  reaksi/cm<sup>3</sup>s. Sedangkan nilai laju reaksi penangkapan dengan dan tanpa filter mengalami penurunan seiring peningkatan persentase pengayaan  $U^{233}$ . Nilai tertinggi laju reaksi penangkapan dengan filter yaitu  $2,2156 \times 10^{-2}$  reaksi/cm<sup>3</sup>s dan tanpa filter  $2,4906 \times 10^{-2}$  reaksi/cm<sup>3</sup>s. Pada material 3, nilai laju reaksi fisi dan reaksi penangkapan neutron dengan dan tanpa filter mengalami penurunan seiring peningkatan persentase pengayaan  $U^{233}$  pada material 1. Nilai tertinggi laju reaksi fisi dengan filter yaitu  $1,5218 \times 10^{-2}$  reaksi/cm<sup>3</sup>s dan tanpa filter  $1,6293 \times 10^{-2}$  reaksi/cm<sup>3</sup>s. Nilai tertinggi laju reaksi penangkapan dengan filter yaitu  $2,2156 \times 10^{-2}$  reaksi/cm<sup>3</sup>s dan tanpa filter  $2,3993 \times 10^{-2}$  reaksi/cm<sup>3</sup>s. Nilai laju reaksi neutron dengan filter lebih kecil dibandingkan nilai laju reaksi neutron tanpa filter.

**Kata kunci:** laju reaksi neutron, SCWR, thorium, SRAC.

## ABSTRACT

### STUDY NEUTRON REACTION RATE CALCULATION IN THE REACTOR SCWR HEXAGONAL ASSEMBLY USING THORIUM AS FUEL MATERIALS

By

**Apriliana**

*The calculation of fission and capture reaction rate with and without filter has been done using REACT of SRAC. In material 1 fission reaction rate with and without filter were increased by increasing percent of  $U^{233}$ . The highest fission reaction rate with filter was  $5,7194 \times 10^{-2}$  reaction/cm<sup>3</sup>s and without filter was  $6,1361 \times 10^{-2}$  reaction/cm<sup>3</sup>s. Meanwhile capture reaction rate with and without filter were decreased by increasing percent of  $U^{233}$ . The highest capture reaction rate with filter was  $2,2156 \times 10^{-2}$  reaction/cm<sup>3</sup>s and without filter was  $2,4906 \times 10^{-2}$  reaction/cm<sup>3</sup>s. In material 3, fission and capture reaction rate with and without filter were decreased by increasing percent of  $U^{233}$  in material 1. The highest fission reaction rate with filter was  $1,5218 \times 10^{-2}$  reaction/cm<sup>3</sup>s and without filter was  $1,6293 \times 10^{-2}$  reaction/cm<sup>3</sup>s. The highest capture reaction rate with filter was  $2,2156 \times 10^{-2}$  reaction/cm<sup>3</sup>s and without filter was  $2,3993 \times 10^{-2}$  reaction /cm<sup>3</sup>s. Neutron reaction rate with filter was smaller than neutron reaction rate without filter.*

**Keywords:** neutron reaction rate, SCWR, thorium, SRAC.