

ANALISIS KARAKTERISTIK SPEKTRUM ENERGI DAN FLUKS NEUTRON ARAH RADIAL DARI TERAS PADA DINDING TANGKI REAKTOR KARTINI

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ABSTRAK

Tujuan penelitian ini adalah (1) untuk mengetahui nilai fluks neutron dan (2) untuk mengetahui spektrum energi neutron arah radial dari teras pada dinding tangki Reaktor Kartini.

Penentuan fluks neutron pada dinding tangki Reaktor Kartini dilakukan dengan metode aktivasi detektor keping (foil). Ada tiga foil yang digunakan yaitu foil emas (foil emas terbungkus *Cadmium* dan foil emas tidak terbungkus *Cadmium*), foil tembaga (Cu) dan foil *Indium* (In). Foil emas terbungkus *Cadmium* akan mendeteksi fluks neutron total dan foil emas tidak terbungkus *Cadmium* akan mendeteksi fluks neutron epitermal. Selisih antara keduanya akan menghasilkan fluks neutron termal. Hubungan antara energi neutron dengan fluks neutron yang dideteksi oleh foil Au, foil In, dan foil Cu akan membentuk spektrum energi neutron.

Hasil penelitian menunjukkan bahwa fluks neutron arah radial dari teras pada dinding tangki Reaktor Kartini untuk fluks neutron total, fluks neutron epitermal dan fluks neutron termal berturut-turut adalah $(4,98 \pm 0,05) \times 10^2 \text{ ncm}^{-2}\text{s}^{-1}$, $(1,52 \pm 0,02) \times 10^2 \text{ ncm}^{-2}\text{s}^{-1}$, dan $(3,4584 \pm 0,06) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$ dengan nilai banding *Cadmium*nya sebesar 3,278013. Sedangkan fluks neutron yang dideteksi oleh foil Cu dan foil In berturut-turut adalah $(2,09 \pm 0,02) \times 10^2 \text{ ncm}^{-2}\text{s}^{-1}$ dan $(6,63 \pm 0,07) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$. Spektrum yang terbentuk menunjukkan *trend* neutron dengan energi rendah memiliki fluks neutron tinggi, sedangkan neutron dengan energi tinggi memiliki fluks neutron rendah.

Kata kunci: spektrum energi, fluks neutron, arah radial, dinding tangki Reaktor Kartini

CHARACTERISTIC ANALYSIS OF ENERGY SPECTRUM AND NEUTRON FLUX ON RADIAL DIRECTION FROM REACTOR CORE ON THE WALL OF THE KARTINI REACTOR TANK

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Abstract

The purpose of this research were (1) to determine the value of the neutron flux and (2) to determine the neutron energy spectrum on radial direction from reactor core on the wall of the Kartini Reactor tank.

The determination of the neutron flux in the wall of the Kartini Reactor tank is done by the foil detector activation method. There were three foils were used, i.e a gold foil (a cadmium covered gold foil and a cadmium uncovered gold foil), a cuprum foil (Cu), and an indium foil (In). a cadmium covered gold foil was used to detect the epithermal neutron flux and a cadmium uncovered gold foil was used to detect the total of neutron flux. The difference between epithermal neutron flux and the total of neutron flux is called thermal neutron flux. The relation between neutron energy and neutron flux were detected by Au foil, In foil, and Cu foil will form the neutron energy spectrum.

The result of this research indicate that the neutron flux on radial direction from reactor core on the wall of the Kartini Reactor tank for the total of neutron flux, epithermal neutron flux, and thermal neutron flux respectively was $(4,98 \pm 0,05) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$, $(1,52 \pm 0,02) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$, and $(3,4584 \pm 0,06) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$ with the cadmium ratio value was 3,278013. While neutron flux detected by a Cu foil and a In foil respectively was $(2,09 \pm 0,02) \times 10^2 \text{ ncm}^{-2}\text{s}^{-1}$ and $(6,63 \pm 0,07) \times 10^5 \text{ ncm}^{-2}\text{s}^{-1}$. The formed spectrum shows trend that neutron with low energy has high neutron flux, while neutron with high energy has low neutron flux.

Keywords: energy spectrum, neutron flux, radial direction, the wall of the Kartini Reactor tank

