ANALISIS NEUTRONIK *MOLTEN SALT REACTOR* (MSR) *DUAL FUEL* DENGAN BAHAN BAKAR ^{235}U-^{238}UF$_4$-LiF DAN MODIFIKASI *BLANKET* ^{232}ThF$_4$-^{238}UF$_4$-LiF

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INTISARI

Molten Salt Reactor (MSR) adalah salah satu jenis reaktor generasi IV yang sedang dikembangkan saat ini. Reaktor generasi IV dikembangkan untuk menjawab beberapa tantangan seperti semakin menipisnya persediaan bahan bakar nuklir, menekan dampak dan probabilitas terjadinya kecelakaan reaktor, meminimalkan limbah nuklir, dan meningkatkan nilai ekonomi dari reaktor. Salah satu jenis reaktor yang sedang diteliti di Departemen Teknik Nuklir dan Teknik Fisika Universitas Gadjah Mada adalah MSR *dual fuel* yang merupakan jenis MSR *two fluid*.

Tujuan dari penelitian ini adalah untuk mengetahui pengaruh ukuran geometri *blanket* pada parameter faktor multiplikasi (k), *Conversion Ratio* (C_R), koefisien reaktivitas suhu (α_T), dan koefisien reaktivitas *void* (α_ρ) pada teras *Molten Salt Reactor* (MSR) *Dual Fuel* berbahan bakar ^{235}U-^{238}UF$_4$ -LiF dan *blanket* ^{232}ThF$_4$-^{238}UF$_4$-LiF.

Bedasarkan hasil penelitian ini diperoleh data dimana semakin besar variasi pengayaan pada uranium bahan bakar nilai faktor multiplikasi (k) semakin besar, namun nilai *Conversion Ratio* (CR) semakin kecil, sebaliknya semakin kecil pengayaan uranium pada bahan bakar nilai faktor multiplikasi (k) semakin kecil namun nilai *Conversion Ratio* semakin besar. Pada variasi pengayaan uranium 2% dengan jari-jari kanal *blanket* reaktor 5 cm nilai α_T = -0,0005 \$/K dan nilai $\rho(\vartheta)$ = -0,006 ϑ^2 + 0,0207 ϑ - 35,096.

Kata kunci : MSR *dual fuel,* Faktor multiplikasi efektif, *Conversion ratio,* Koefisien reaktivitas suhu, Koefisien reaktivitas *void*

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ABSTRACT

Molten Salt Reactor (MSR) is one type of generation IV reactors are being developed at this time. Generation IV reactors was developed to address some of the challenges such as the decreasing of nuclear fuel supply, reducing the impact and probability of reactor accidents, minimizing nuclear waste, and increasing the economic value of the nuclear reactor. One type of generation IV reactors that is being developed in Departement of Nuclear Engineering and Physics Engineering of Universitas Gadjah Mada is MSR dual fuel which include in MSR two fluid.

The purpose of this study was to determine the effect size of the geometry of the blanket on the parameters of the multiplication factor (k), Conversion Ratio (C_R), coefficient of temperature reactivity (α_T), and coefficient of void reactivity (α_ρ) on the terrace Molten Salt Reactor (MSR) Dual Fuel with fuel ^{235}U-^{238}UF$_4$ -LiF and blanket ^{232}ThF$_4$-^{238}UF$_4$-LiF.

Based on these results obtained from the data where the greater variation enrichment in uranium fuel, the greater the value of multiplication factor (k), but the value of Conversion Ratio (CR) is getting smaller, otherwise the smaller the enrichment of uranium in the fuel the smaller value of the multiplication factor (k) however the value of Conversion Ratio is getting greater. In a variation of 2% uranium enrichment with a radius of 5 cm channel blanket reactor α_T = -0.0005 \$/K and $\rho(\vartheta)$ = -0.006 ϑ^2 + 0.0207 ϑ – 35.096.

Keyword : MSR dual fuel, Effective multiplication factor, *Conversion ratio*, Coefficient of temperature reactivity, Coefficient of void reactivity

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