

ABSTRAK

PENGARUH KOMPOSISI *MOLTEN SALT* (NaNO_3 , KNO_3 , DAN NaNO_2) TERHADAP SUHU DAN KEHILANGAN MASSA MENGGUNAKAN *THERMOGRAVIMETRIC ANALYSIS* (TGA)

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Molten salt berbasis campuran NaNO_3 - KNO_3 merupakan kandidat unggul dalam sistem penyimpanan energi termal untuk aplikasi *Concentrated Solar Power* (CSP) karena memiliki kapasitas panas tinggi dan kestabilan termal yang baik. Namun, peningkatan efisiensi sistem masih diperlukan dengan memodifikasi komposisi melalui penambahan aditif seperti NaNO_2 . Penelitian ini bertujuan untuk menganalisis pengaruh penambahan NaNO_2 terhadap kestabilan termal *molten salt* menggunakan *Thermogravimetric Analysis* (TGA). Empat variasi komposisi sampel dengan komposisi berbeda diuji pada suhu 30–700°C dalam atmosfer gas argon. Parameter yang dianalisis meliputi suhu dekomposisi awal, suhu dekomposisi maksimum, total weight loss, dan massa residu. Penelitian menunjukkan bahwa penambahan NaNO_2 dapat meningkatkan kestabilan termal, dengan sampel mengandung 1,69% NaNO_2 (Sampel-3) memiliki total weight loss terendah (1,37%) dan suhu dekomposisi awal tertinggi (45,349°C). Sebaliknya, penambahan NaNO_2 berlebih (3%) justru menurunkan kestabilan. Penelitian ini membuktikan bahwa penambahan NaNO_2 dalam jumlah optimal dapat memperbaiki performa *molten salt* sebagai media penyimpanan energi termal. Hasil ini memberikan kontribusi penting dalam pengembangan material penyimpan energi yang efisien dan andal untuk sistem CSP.

Kata kunci: *Molten salt*, TGA, stabilitas termal.

ABSTRACT

EFFECT OF THE COMPOSITION OF MOLTEN SALT (NaNO_3 , KNO_3 , AND NaNO_2) ON THE TEMPERATURE AND MASS LOSS CHARACTERIZED BY THERMOGRAVIMETRIC ANALYSIS (TGA)

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Molten salt based on a NaNO_3 - KNO_3 mixture is a promising candidate for thermal energy storage systems in Concentrated Solar Power (CSP) applications due to its high heat capacity and good thermal stability. However, further improvements in system efficiency are needed by modifying the composition through the addition of additives such as NaNO_2 . This study aims to analyze the effect of NaNO_2 addition on the thermal stability of molten salt using Thermogravimetric Analysis (TGA). Four sample compositions with different compositions were tested at temperatures ranging from 30–700°C in an argon gas atmosphere. The parameters analyzed include initial decomposition temperature, maximum decomposition temperature, total weight loss, and residual mass. The study showed that the addition of NaNO_2 can improve thermal stability, with the sample containing 1.69% NaNO_2 (Sample-3) having the lowest total weight loss (1.37%) and the highest initial decomposition temperature (45.349°C). Conversely, excessive addition of NaNO_2 (3%) actually reduces stability. This study demonstrates that the addition of NaNO_2 in optimal amounts can improve the performance of molten salt as a thermal energy storage medium. These results provide an important contribution to the development of efficient and reliable energy storage materials for CSP systems.

Keywords: Molten salt, TGA, thermal stability.