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COVER LETTER

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Dear,
We wish to submit an original research article entitled "**Technology Development of NiO-Modified Activated Carbon from Polyethylene Terephthalate (PET) Bottle Waste for Adsorbed Natural Gas (ANG) Storage**" for consideration by SINERGI.

We confirm that this work is original and has not been published elsewhere, nor is it currently under consideration for publication elsewhere. We promise not to withdraw this article after it has been processed by the Editorial Team. If there is a withdrawal, we are willing to pay a penalty of USD 150 (IDR 2000K) to the SINERGI Editorial Team.

In this paper, we report on:

Field	:	Chemical Engineering
Topic	:	Activated Carbon from PET Waste for ANG (Adsorbed Natural Gas)
Brief Background	:	Indonesia's rising energy demand highlights the need for cleaner alternatives like natural gas. Adsorbed Natural Gas (ANG) offers a safer, low-pressure storage method using porous adsorbents such as activated carbon. PET plastic waste, rich in carbon, presents a sustainable precursor for activated carbon production. This study investigates converting PET waste into NiO-modified activated carbon via carbonization, KOH activation, N_2 treatment, and $Ni(NO_3)_2 \cdot 6H_2O$ impregnation. The goal is to develop a low-cost, efficient ANG adsorbent while promoting plastic waste valorization.
Research Problem	:	This research investigates how the production process of activated carbon using chemical activation with KOH and physical activation with N_2 influences its surface area. It also examines the effect of $Ni(NO_3)_2 \cdot 6H_2O$ metal impregnation on the methane adsorption capacity of the activated carbon. Furthermore, the study explores how variations in natural gas pressure and storage

		temperature impact the overall methane adsorption performance of the material in Adsorbed Natural Gas (ANG) applications.
Overview of Method	:	This study synthesizes NiO-modified activated carbon from PET waste for ANG applications through a two-step process: carbonization at 480 °C, chemical activation with 4 M KOH, physical activation under N_2 flow at 800 °C, and impregnation with $Ni(NO_3)_2 \cdot 6H_2O$ at varying concentrations (0.5–2%). The samples are characterized using iodine number tests, SEM, and EDS. Methane adsorption–desorption performance is evaluated volumetrically at pressures of 3–9 bar and temperatures of 28–35 °C to assess their suitability as ANG adsorbents.
Significant finding	:	This study successfully produced granular activated carbon from PET plastic waste with a high surface area, making it suitable for gas storage applications. The research also generated important data on the adsorption and desorption capacities of methane under various conditions relevant to Adsorbed Natural Gas (ANG) technology, highlighting the material's potential as an efficient and sustainable solution for clean energy storage.

We have no conflicts of interest to disclose.

Thank you for your consideration of this manuscript.

Sincerely,
[*Yuliusman*]