KRONOLOGI (KORESPONDENSI) PUBLIKASI ARTIKEL PADA JURNAL INTERNASIONAL BEREPUTASI DAN BERDAMPAK FAKTOR

Judul	:	Synthesis, Characterization, and Electrochemical Performance of Reduced Graphene Oxide-Metal (Cu,Zn)-Oxide Materials
Nama Jurnal	:	**Indonesian Journal of Science & Technology (IJOST)** **Terindeks Scopus, SJR = 0.71**
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Halaman	:	329 - 344
Tahun	:	2023
Penulis	:	Sugianto Sugianto[1],*, Ngurah Made Dharma Putra[1] , Endah F. Rahayu[2] , Wahyu B. Widayatno[3] , Cherly Firdharini[3] , Slamet Priyono[3] , Didik Aryanto[3]
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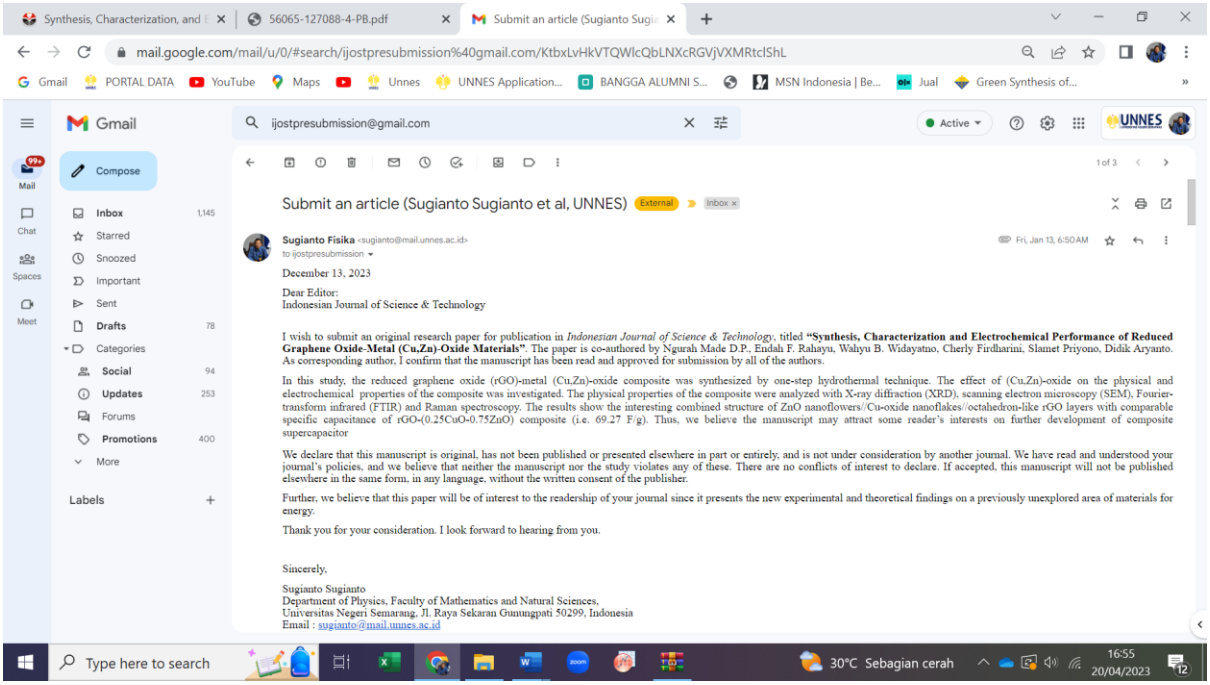
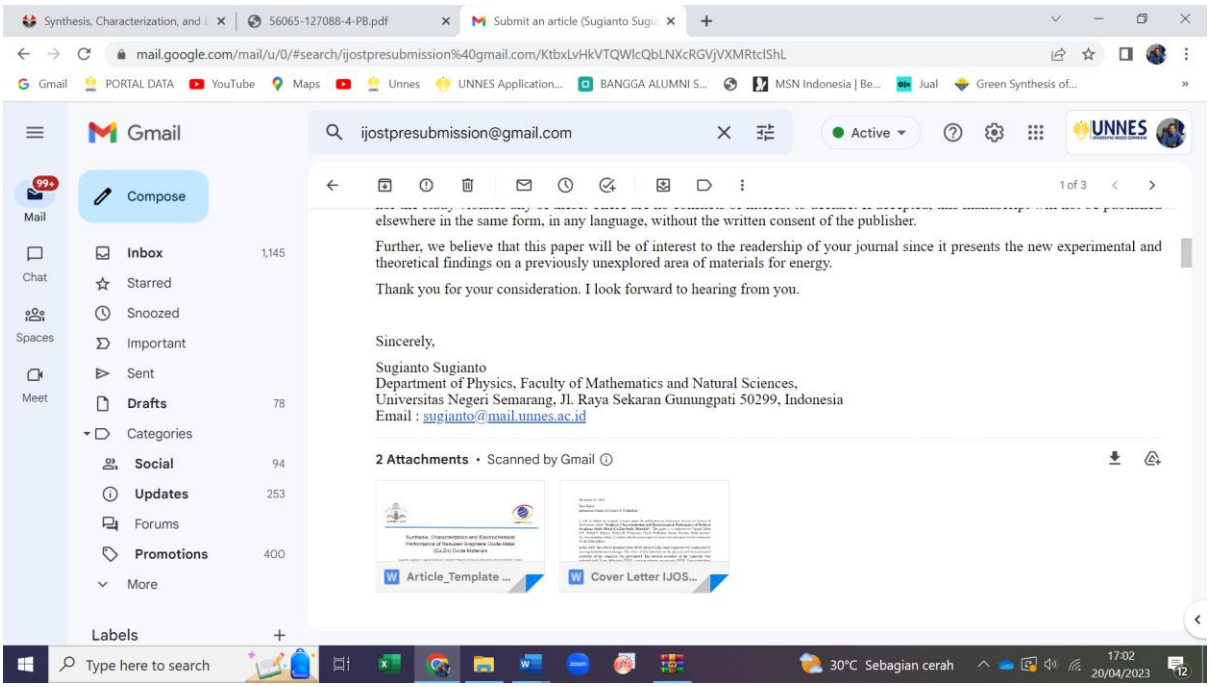
No	Tanggal	Aktivitas
1	13 Januari 2023	Mengirim manuskrip dan cover letter ke Editor IJOST (ijostpresubmission@gmail.com)
2	13 Januari 2023	Manuskrip diterima oleh Editor untuk diteruskan ke Reviewer
3	12 Februari 2023	Hasil review manuskrip tahap pertama
4	26 Februari	Revisi manuskrip dan respon pertanyaan reviewer dikirim ke Editor
5	7 Maret 2023	Manuskrip status ACCEPTED dilampiri invoice beaya penerbitan
6	7 Maret 2023	Pembayarann beaya penerbitan
7	**9 Maret 2023**	**Available first online in IJOST (2023) Vol. 8(2) p. 329-344.**

1. **Submit manuskrip ke IJOST (13 Januari 2023) via email: ijostpresubmission@gmail.com dengan attached file: 1) manuskrip, dan 2) Cover Letter.**





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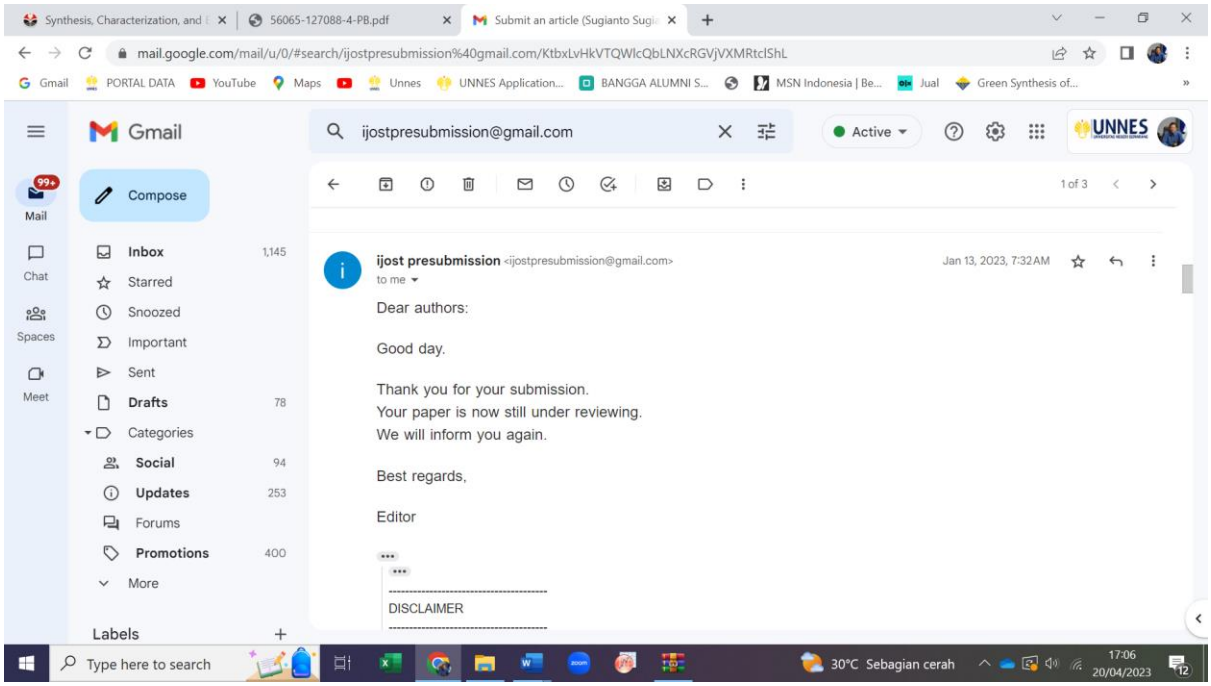
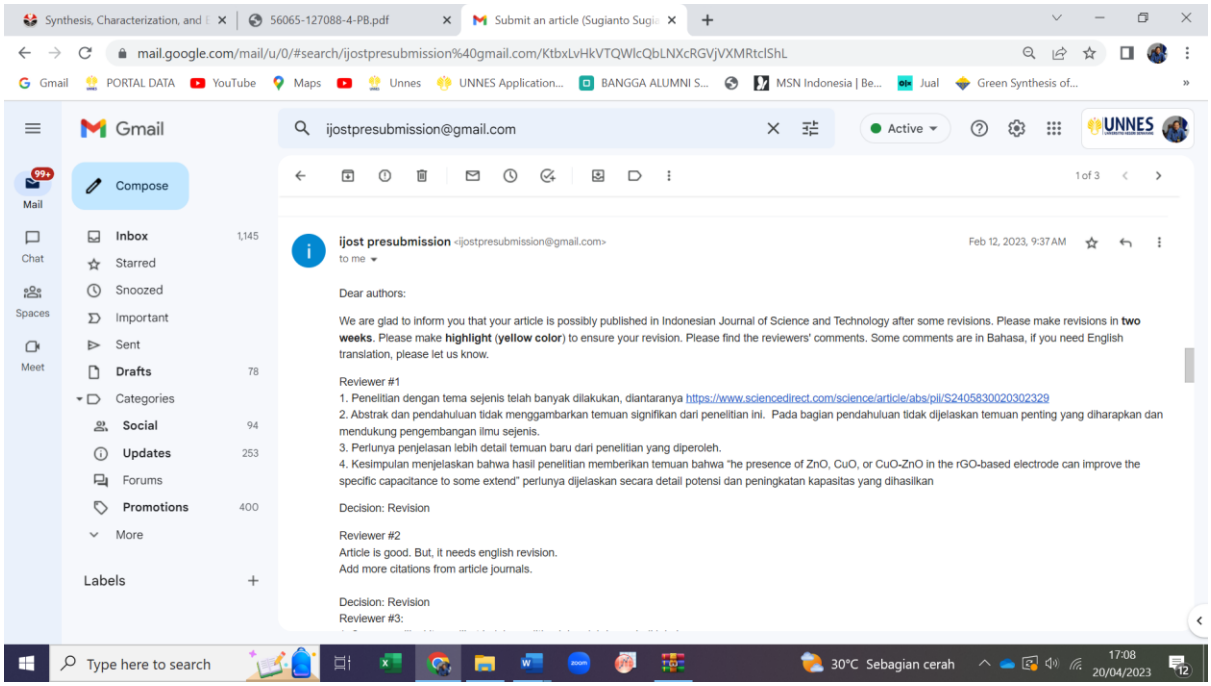
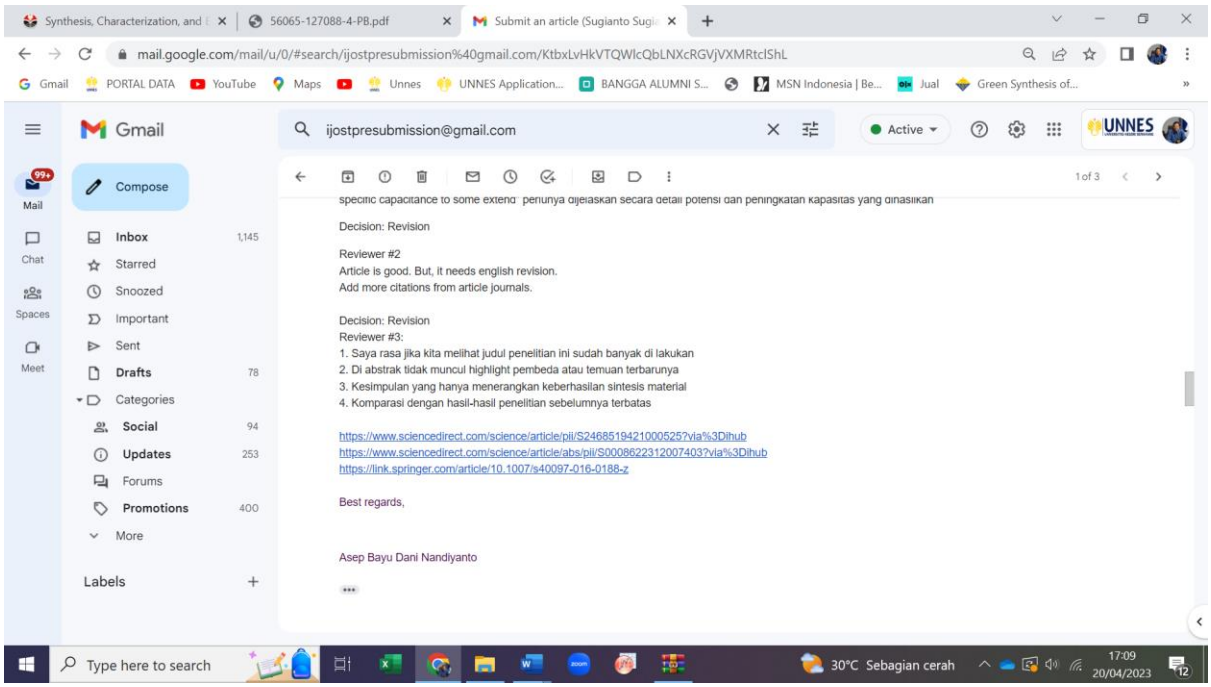
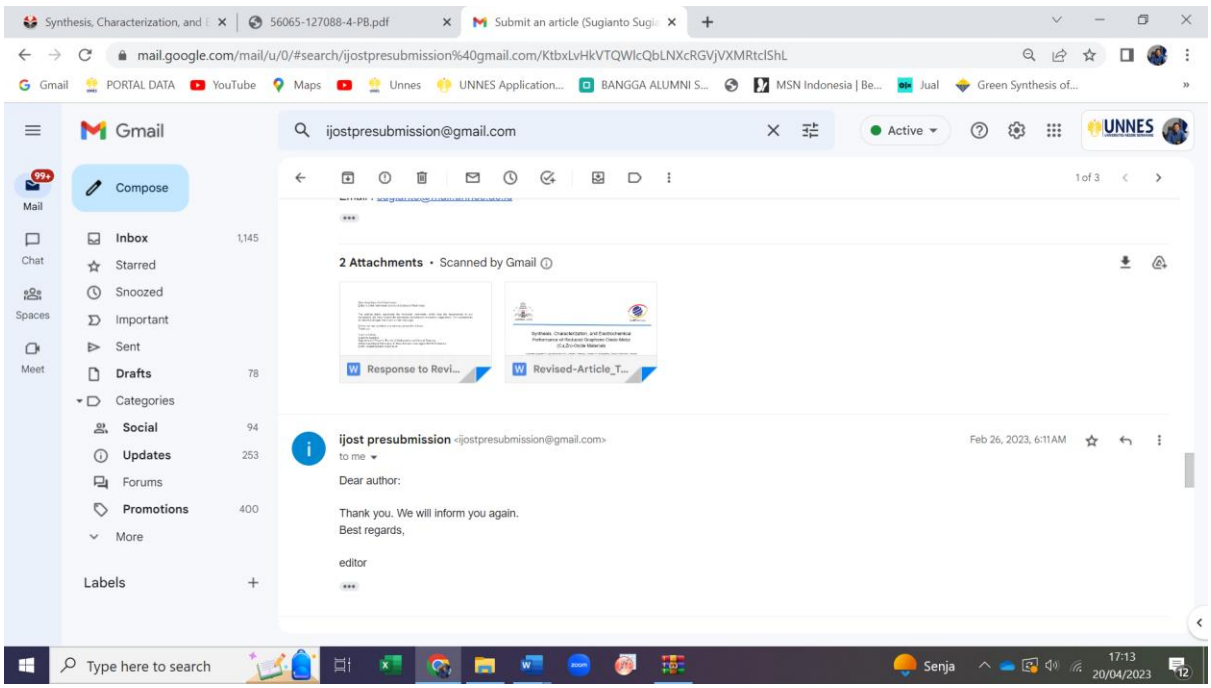


3. **Hasil review manuskrip tahap pertama (12 Februari 2023)**





4. Revisi manuskrip dan respon dikirim ke Editor (26 Februari 2023)



Dear Asep Bayu Dani Nandiyanto,
Editor in Chief Indonesian Journal of Science & Technology

The authors highly appreciate the reviewers' comments, which help the improvement of our manuscript. We have revised the manuscript according to reviewers' suggestions. The explanations for detailed changes are shown on the next page.

If there are any questions or problems, please let us know.
Thank you.

Yours sincerely,
Sugianto Sugianto
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Universitas Negeri Semarang, Jl. Raya Sekaran Gunungpati 50299, Indonesia
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We would like to thank you for spending your precious time to review our manuscript. We elaborate and revised the manuscript according to your invaluable comments.

Reviewer #1

Comment #1: Penelitian dengan tema sejenis telah banyak dilakukan, diantaranya https://www.sciencedirect.com/science/article/abs/pii/S2405830020302329
Response: Thank you for your concern. Recently, research on the development of metal oxide (especially ZnO and CuO) -rGO composites has attracted and been studied by many researchers. However, in our work we used a method that is different from the reports of previous researchers. Our research, adopted the research of Maity et al. (2018) by several modifications, such as not using ammonia, as well as the utilization of elevated temperature and extended time. The obtained results are also new findings, where ZnO and CuO have a morphology consisting of two forms of microstructure. We have added sentences in the introduction for the reader convenience.

Based on the previous reports, ZnO-rGO, CuO-rGO and ZnO-CuO-rGO composites can be synthesized using several methods. Miah et al. (2020) and Du et al. (2019) prepared each composite part separately prior to final mixing. Alternatively, the forming process of ZnO or CuO can be carried out in GO suspension using coprecipitation or solvothermal methods (Rai et al., 2021; Kumar et al., 2020; Praburaj et al., 2021; Sagadevan et al., 2018), where strong solutions such as H_2SO_4, ammonia, etc are used. A simple, facile, cheapest and eco-friendly route for synthesis of ZnO or CuO -rGO composite has been reported by Maity et al. (2018), but still used ammonia during the composite synthesis. It is reported that ZnO or CuO have a single shape, like a sphere, flake, or rod. Until now, no one has reported the multi-shape behaviour of ZnO or CuO in the composite. Previous study reported that the morphological features of the materials contribute a significant impact on the supercapacitor performance (Wei et al., 2021).

Inspired by the above research results, we present a simple one-step facile synthesis of rGO-metal (Cu,Zn)-oxide composites as an electrode materials for supercapacitor. The method is simple, inexpensive and eco-friendly which is modified from Maity et al. (2018), where the utilization of hazardous chemical such as ammonia is unfavored. The results show that the ZnO or CuO particles have more than one shape within the composite structure. Besides, their particles embedded and agglomerated over the GO surface. The effect of surface morphology, crystal structure, microstructure, and surface functional groups on the supercapacitor performance, as well as the practicallity will be discussed in detail.

Comment #2: Abstrak dan pendahuluan tidak menggambarkan temuan signifikan dari penelitian ini. Pada bagian pendahuluan tidak dijelaskan temuan penting yang diharapkan dan mendukung pengembangan ilmu sejenis.
Response: Thank you for your highlights. We have added sentences describing the significant findings of this study in the abstract. In addition, we have also added sentences I order to clearly explain the differences between previous and current study in the introduction section, as well as the summary which explain the important findings of this study in the conclusion section.

For the abstract, we have added the sentences as follow:
In this work, the reduced graphene oxide (rGO) and metal (Cu,Zn)-oxide composites were synthesized by one-step hydrothermal technique. The role of (Cu,Zn)-oxide on the physical and electrochemical properties of the composite was investigated. The physical properties of the composites were analyzed with SEM, XRD, FTIR and Raman spectroscopy. The composite consists of various shapes of ZnO nanoflowers and micro-spheres, as well as Cu-oxide nanoflakes and octahedron-like shapes. The (Zn,Cu)-oxides were formed in-between the rGO layers and observed in the rGO-ZnO, rGO-CuO and rGO-CuO-ZnO composites. The presence of ZnO, CuO and rGO within the composite structure are also confirmed by the analyses of crystal structure, microstructure, and surface functional groups. The electrochemical properties of the composite obtained from different content of (Cu,Zn)-oxide were investigated through galvanostatic charging-discharging (GDC) measurements in a 1M KOH electrolyte at a constant current density of 0.17 A/g. Some excess impurities, remained from the surfactant, give considerable differences on the electrochemical performance of the composites. The specific capacitance values of the rGO, rGO-ZnO, rGO-CuO, rGO-(0.5CuO-0.5ZnO), and rGO-(0.25CuO-0.75ZnO) composites are 9.32 F/g, 58.53 F/g, 54.14 F/g, 25.21 F/g, and 69.27 F/g, respectively. In this

work, the formation of double metal-oxide structure as well as their insertion into rGO sheet can significantly improve the electrochemical properties of supercapacitor.

For Introduction, we have added the sentences as follow:

Based on the previous reports, ZnO-rGO, CuO-rGO and ZnO-CuO-rGO composites can be synthesized using several methods. Miah et al. (2020) and Du et al. (2019) prepared each composite part separately prior to final mixing. Alternatively, the forming process of ZnO or CuO can be carried out in GO suspension using coprecipitation or solvothermal methods (Rai et al., 2021; Kumar et al., 2020; Praburaj et al., 2021; Sagadevan et al., 2018), where strong solutions such as H_2SO_4, ammonia, etc are used. A simple, facile, cheapest and eco-friendly route for synthesis of ZnO or CuO -rGO composite has been reported by Maity et al. (2018), but still used ammonia during the composite synthesis. It is reported that ZnO or CuO have a single shape, like a sphere, flake, or rod. Until now, no one has reported the multi-shape behaviour of ZnO or CuO in the composite. Previous study reported that the morphological features of the materials contribute a significant impact on the supercapacitor performance (Wei et al., 2021).

Inspired by the above research results, we present a simple one-step facile synthesis of rGO-metal (Cu,Zn)-oxide composites as an electrode materials for supercapacitor. The method is simple, inexpensive and eco-friendly which is modified from Maity et al. (2018), where the utilization of hazardous chemical such as ammonia is unfavored. The results show that the ZnO or CuO particles have more than one shape within the composite structure. Besides, their particles embedded and agglomerated over the GO surface. The effect of surface morphology, crystal structure, microstructure, and surface functional groups on the supercapacitor performance, as well as the practicallity will be discussed in detail.

Comment #3: Perlunya penjelasan lebih detail temuan baru dari penelitian yang diperoleh.
Response: Thank you for your suggestion. We have added further discussion in the results and discussion section.

These findings suggest that the morphological feature of ZnO or CuO -rGO composites has a significant impact on their electrochemical properties. As reported by Wei et al. (2021), the abundant nanosheet and nanowires in the Co_3O_4/Ni Foam may likely contribute to the high specific capacitance, superior charge-storage feature as well as superior electrochemical performance of the supercapacitor. In addition, the incorporation of metal-oxide (i.e. ZnO or CuO) into the rGO structure provides abundant active sites and promotes ion permeation as well as ion exchange on the rGO electrode surface. Thus, it can be considered as an alternative approach to obtain high-performance supercapacitor.

Comment #4: Kesimpulan menjelaskan bahwa hasil penelitian memberikan temuan bahwa "he presence of ZnO, CuO, or CuO-ZnO in the rGO-based electrode can improve the specific capacitance to some extend" perlunya dijelaskan secara detail potensi dan peningkatan kapasitas yang dihasilkan
Response: Thank for your suggestion. We have added the required sentence in the conclusion section.

In the present study, the structural modification (i.e. the insertion of CuO, ZnO or CuO-ZnO into rGO sheet) can significantly improve the specific capacitance and energy density of supercapacitor.

Reviewer #2

1. Article is good. But, it needs english revision.
2. Add more citations from article journals.

Response: We have revised the English and have added more citations according to the reviewer's suggestion.

Reviewer #3:

Comment #1: Saya rasa jika kita melihat judul penelitian ini sudah banyak di lakukan
https://www.sciencedirect.com/science/article/pii/S2468519421000525?via%3Dihub
https://www.sciencedirect.com/science/article/abs/pii/S0008622312007403?via%3Dihub
https://link.springer.com/article/10.1007/s40097-016-0188-z
Response: Thank you for your concern. Recently, research on the development of metal-oxide (especially ZnO and CuO) -rGO composites has attracted and been studied by many researchers. However, in our work we used a different method from the reports of previous researchers. Our research, adopted the research of Maity et al. (2018) by modifying it, such as not using ammonia, the temperature is raised and the time is extended. The results obtained are also new findings, where ZnO and CuO have a morphology consisting of two forms of microstructure. We have added sentences in the introduction for the reader convenience.

Based on the previous reports, ZnO-rGO, CuO-rGO and ZnO-CuO-rGO composites can be synthesized using several methods. Miah et al. (2020) and Du et al. (2019) prepared each composite part separately prior to final mixing. Alternatively, the forming process of ZnO or CuO can be carried out in GO suspension using coprecipitation or solvothermal methods (Rai et al., 2021; Kumar et al., 2020; Praburaj et al., 2021; Sagadevan et al., 2018), where strong solutions such as H_2SO_4, ammonia, etc are used. A simple, facile, cheapest and eco-friendly route for synthesis of ZnO or CuO -rGO composite has been reported by Maity et al. (2018), but still used ammonia during the composite synthesis. It is reported that ZnO or CuO have a single shape, like a sphere, flake, or rod. Until now, no one has reported the multi-shape behaviour of ZnO or CuO in the composite. Previous study reported that the morphological features of the materials contribute a significant impact on the supercapacitor performance (Wei et al., 2021).

Inspired by the above research results, we present a simple one-step facile synthesis of rGO-metal (Cu,Zn)-oxide composites as an electrode materials for supercapacitor. The method is simple, inexpensive and eco-friendly which is modified from Maity et al. (2018), where the utilization of hazardous chemical such as ammonia is unfavored. The results show that the ZnO or CuO particles have more than one shape within the composite structure. Besides, their particles embedded and agglomerated over the GO surface. The effect of surface morphology, crystal structure, microstructure, and surface functional groups on the supercapacitor performance, as well as the practicallity will be discussed in detail

Comment #2: Di abstrak tidak muncul highlight pembeda atau temuan terbarunya
Response: Thank you for your concern. We have added particular highlight to emphasize the new finding of this research in abstract section.

In the present study, the structural modification (i.e. the insertion of CuO, ZnO or CuO-ZnO into rGO sheet) can significantly improve the specific capacitance and energy density of supercapacitor.

Comment #3: Kesimpulan yang hanya menerangkan keberhasilan sintesis material
Response: Thank you for your attention. We have inserted additional sentence for describing the main conclusion of our research.

In the present study, the structural modification (i.e. the insertion of CuO, ZnO or CuO-ZnO into rGO sheet) can significantly improve the specific capacitance and energy density of supercapacitor.

Comment #4: Komparasi dengan hasil-hasil penelitian sebelumnya terbatas
Response: Thank you for your suggestion. We have added several previous reports to elaborate the comparison with the present study in the introduction as well as results and discussion section.

In the introduction
Based on the previous reports, ZnO-rGO, CuO-rGO and ZnO-CuO-rGO composites can be synthesized using several methods. Miah et al. (2020) and Du et al. (2019) prepared each composite part separately

prior to final mixing. Alternatively, the forming process of ZnO or CuO can be carried out in GO suspension using coprecipitation or solvothermal methods (Rai et al., 2021; Kumar et al., 2020; Praburaj et al., 2021; Sagadevan et al., 2018), where strong solutions such as H_2SO_4, ammonia, etc are used. A simple, facile, cheapest and eco-friendly route for synthesis of ZnO or CuO -rGO composite has been reported by Maity et al. (2018), but still used ammonia during the composite synthesis.

Du, X., Wang, S., Liu, Y., Lu, M., Wu, K., Lu, M. (2019). Self-assembly of free-standing hybrid film based on graphene and zinc oxide nanoflakes for high-performance supercapacitors. *Journal of Solid State Chemistry*, 277, 441-447.

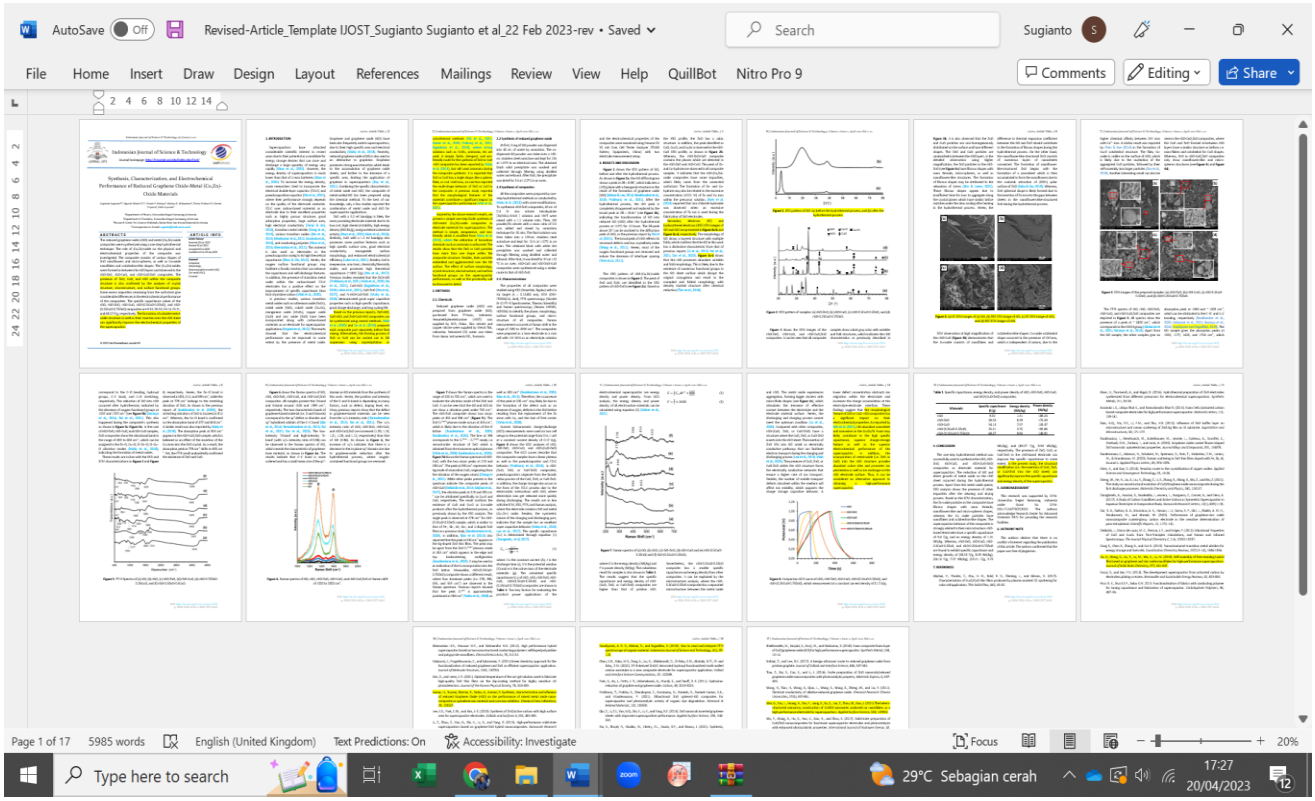
Kumar, H., Rajrani, Sharma, R., Yadav, A., Kumari, R. Synthesis, characterization and influence of reduced Graphene Oxide (rGO) on the performance of mixed metal oxide nano-composite as optoelectronic material and corrosion inhibitor. Chemical Data Collections, 29, 100527.

In the results and discussion

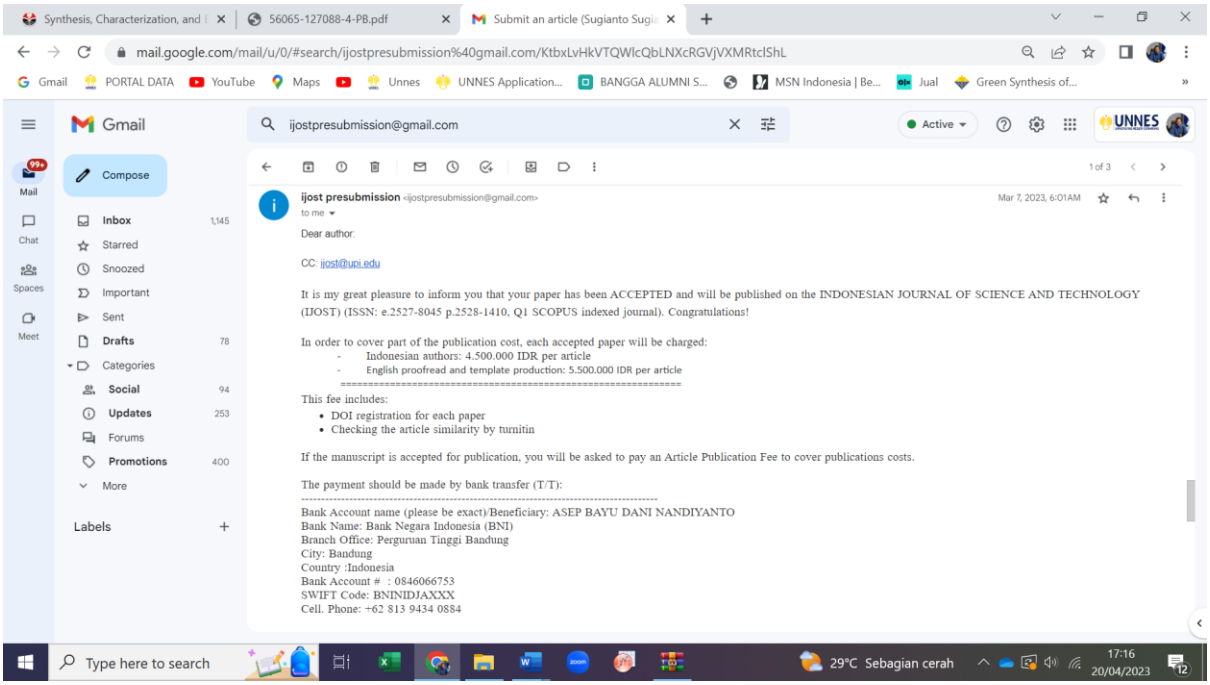
the morphological feature of ZnO or CuO -rGO composites has a significant impact on their electrochemical properties. As reported by Wei et al. (2021), the abundant nanosheet and nanowires in the Co_3O_4/Ni Foam may likely contribute to the high specific capacitance, superior charge-storage feature as well as superior electrochemical performance of the supercapacitor. In addition, the incorporation of metal-oxide (i.e. ZnO or CuO) into the rGO structure provides abundant active sites and promotes ion permeation as well as ion exchange on the rGO electrode surface. Thus, it can be considered as an alternative approach to obtain high-performance supercapacitor.

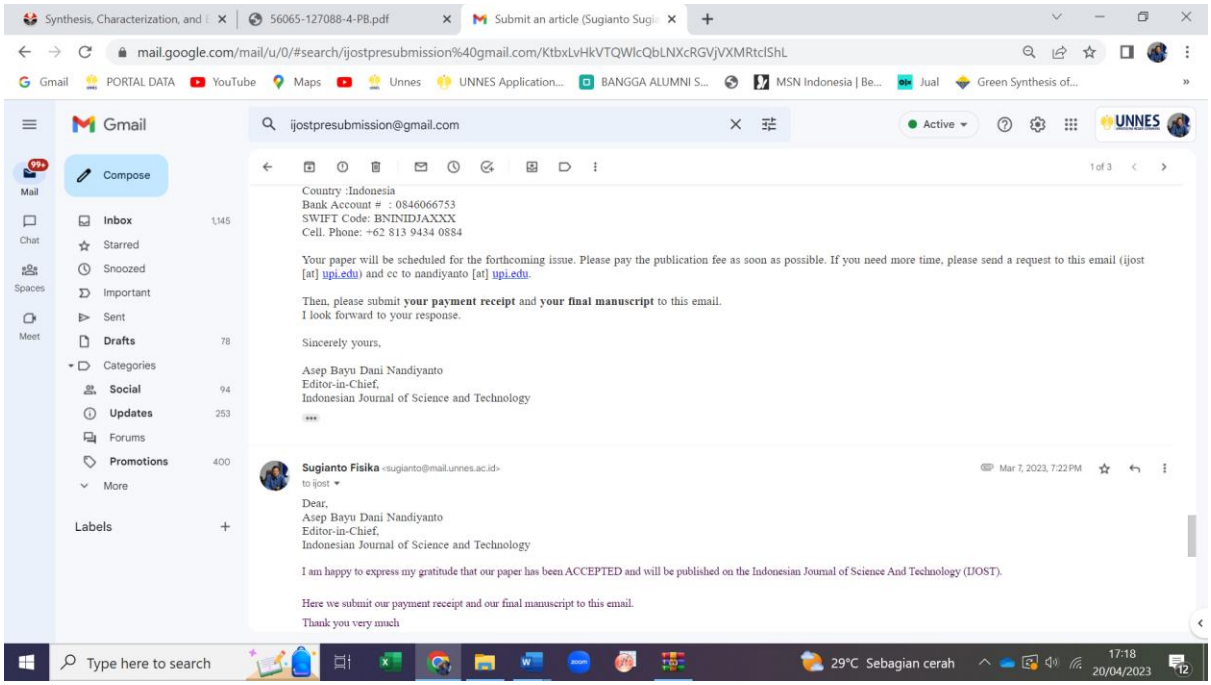
Wei, G., Yan, L., Huang, H., Yan, F., Liang, X., Xu, S., Lan, Z., Zhou, W., Guo, J. (2021) The hetero-structured nanoarray construction of Co3O4 nanowires anchored on nanoflakes as a high-performance electrode for supercapacitors. *Applied Surface Science*, 538, 147932.

Hasil Revisi Manuskrip

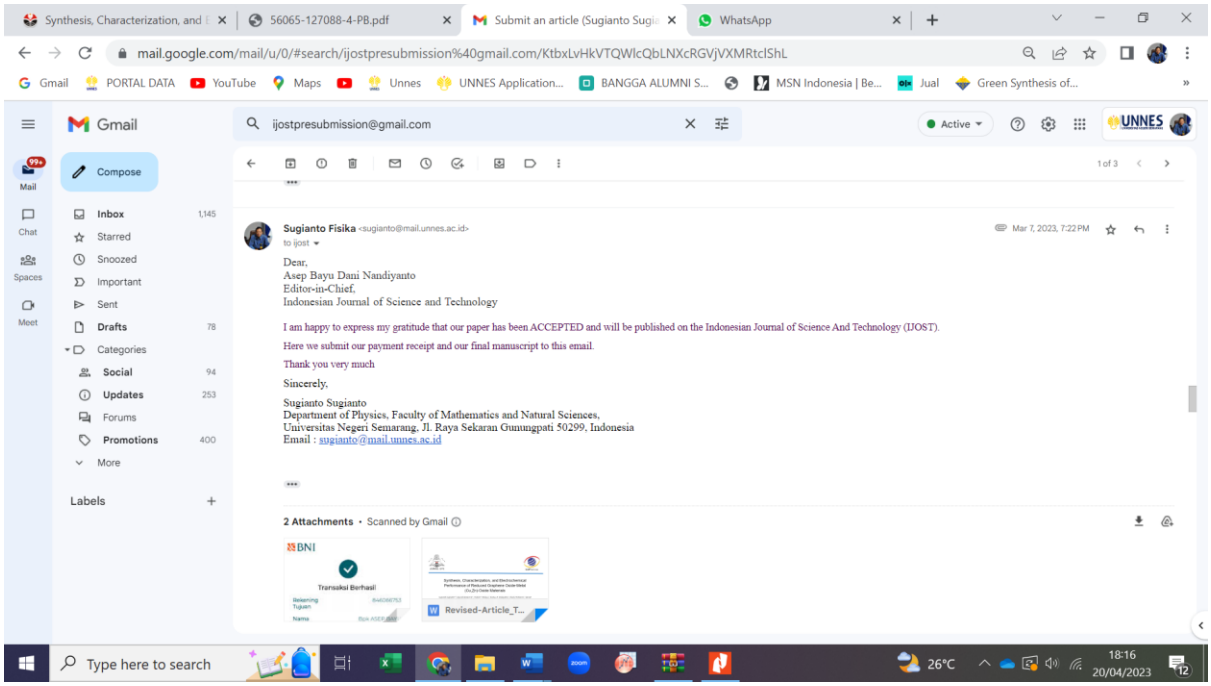


5. Manuskrip status ACCEPTED (7 Maret 2023)

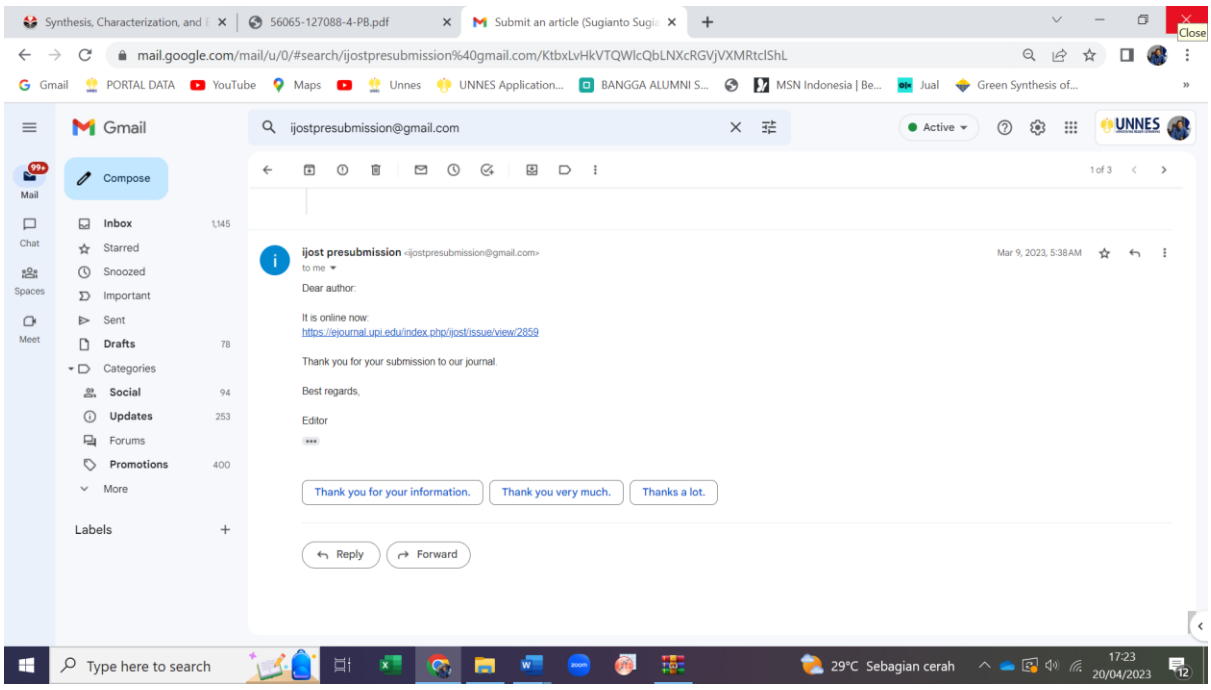




6. Transfer beaya penerbitan (7 Maret 2023)



Available online : 9 Maret 2023

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Synthesis, Characterization, and Electrochemical Performance of Reduced Graphene Oxide-Metal (Cu,Zn)-Oxide Materials
Sugianto Sugianto[1,*], Ngurah Made Dharma Putra[1], Endah F. Rahayu[2], Wahyu B. Widayatno[2], Cherly Firdharini[2], Slamet Priyono[2], Didik Aryanto[3]
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