SIIC082

EFFECT OF B-SITE SUBSTITUTIONS ON THE CATALYTIC ACTIVITY OF PEROVSKITES COMPOUNDS: A REVIEW

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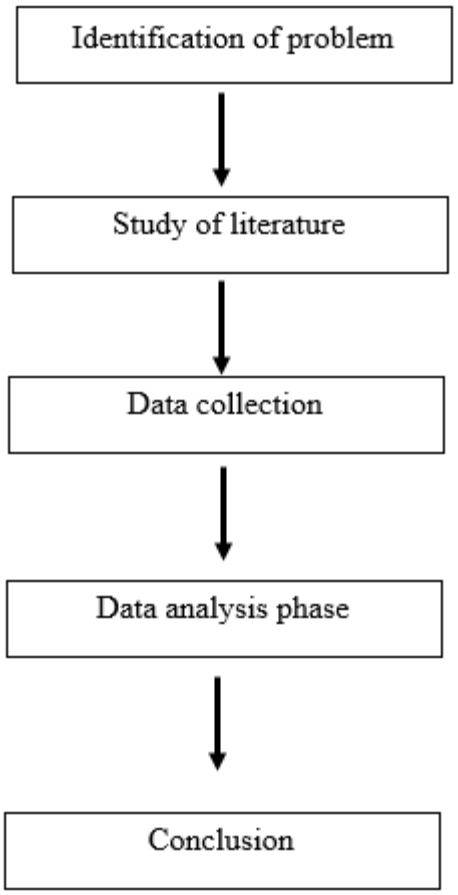
Abstract:
The objective of research are to review the B-site loading or composition on the catalytic activity of perovskite compound and to compare the performance of organic pollutants' degradation using perovskite compounds at different B-site loading or composition.The combination of qualitative and quantative data analysis conducted from the data collection obtained from online based literature such as Science Direct, Springer, Sage and ASCE. The graphical results are obtained from the catalytic performances and characterization analysis such UV-vis spectrophotometer. Moreover, LaFeO3 was highlighted as active degradation of Methylene Blue (MB) dyes and exhibited strong visible-light photocatalytic active. LaCoO3 Photocatalytic properties especially in the degradation of the MB, Methyl oranges and neutral red dyes after 100 min reaction. LaFeO3 perovskites catalyst required time to achieve 90% degradation for 180 min with the catalyst loading of 2gL-1. LaNiO3 perovskites catalyst required 5 hours and considered less efficient compared to Fe and Co B-sites perovskites. The substitution of Ni as B-site to Co element can affect the surface area of the catalyst exhibiting maximum at x=0.5. The analysis of the degradation rate of the organic pollutant by using Fe B-site element obtain 97 percent in 4 hr duration time. Meanwhile, the lowest degradation rate of organic pollutant achieved 80 percent in 6hr duration time by using BaTiO3 perovskite. The required time to achieved 90% followed by LaCoO3 (85%) and LaNiO3 (74.5%). The data finding from previous research is follow the proposed objective of the research including managed to review B-site loading or composition on the catalytic activity of perovskite compounds. In addition, the objective to evaluate the comparative performance of organic pollutants using perovskite compounds at different B-site loading or composition was achieved.

***Keywords*:**
Organic pollutant, Catalyst, Perovskites, Dyes, Degradation

Objectives:

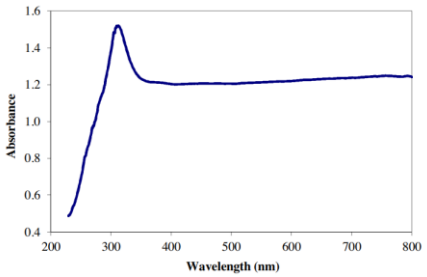
- To review the B-site loading or composition on the catalytic activity of perovskite compounds
- To compare the performance of organic pollutants' degradation using perovskite compounds at different B-site loading or composition

Methodology:

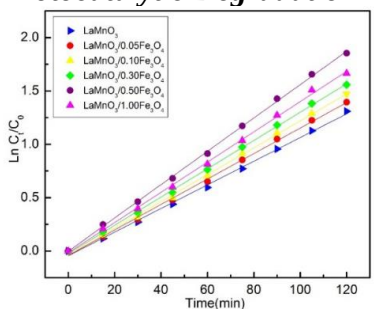


Results:

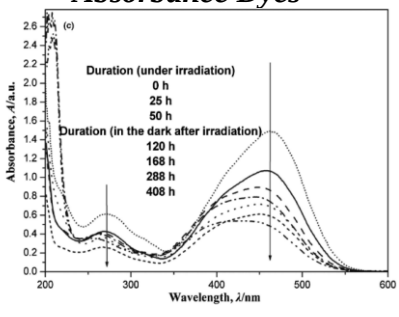
Uv-Vis absorption



Photocatalytic Degradation



Absorbance Dyes



Conclusion:

As conclusion, based on the research about the effect of B-site substitutions on the catalytic activity of perovskites compounds showed different data finding for different type of B-site cation. The data finding from previous research is follow the proposed objective of the research including managed to review B-site loading or composition on the catalytic activity of perovskite compounds. In addition, the objective to evaluate the comparative performance of organic pollutants using perovskite compounds at different B-site loading or composition was achieved. The highest degradation rate of the organic pollutant of dyes was obtained using LaFeO3 perovskite catalyst where Fe as the B-site. The required time to achieved 90% followed by LaCoO3 (85%) and LaNiO3 (74.5%). Meanwhile, SrRuO4 perovskites that used Ru as B site loading achieved better conversion of 43% compared to SrSnO4 perovskites (25%). Hence, as summarization the substitution of B-sites cation on the same A-site for perovskite catalyst will improve the catalytic performance and affect the degradation time required for organic pollutant. The importance of review of effect of B-site substitutions on the catalytic activity of perovskites compounds can help to evaluate the best and effective combination B-site cation of perovskite to be used as pollution treatment for organic pollutant. As recommendation, type of organic pollutant used for research should be controlled variable to provide more reliable data for the research. Last but not least, the condition and parameter of the experiment should be the same for all the different B-site cation to highlight the significance of the research.