Effective photocatalytic degradation of dye pollutant using in-situ synthesized S-doped inverse opal graphitic carbon nitride

Yasamin Shajirati[1],, Byeong-Kyu Lee,*

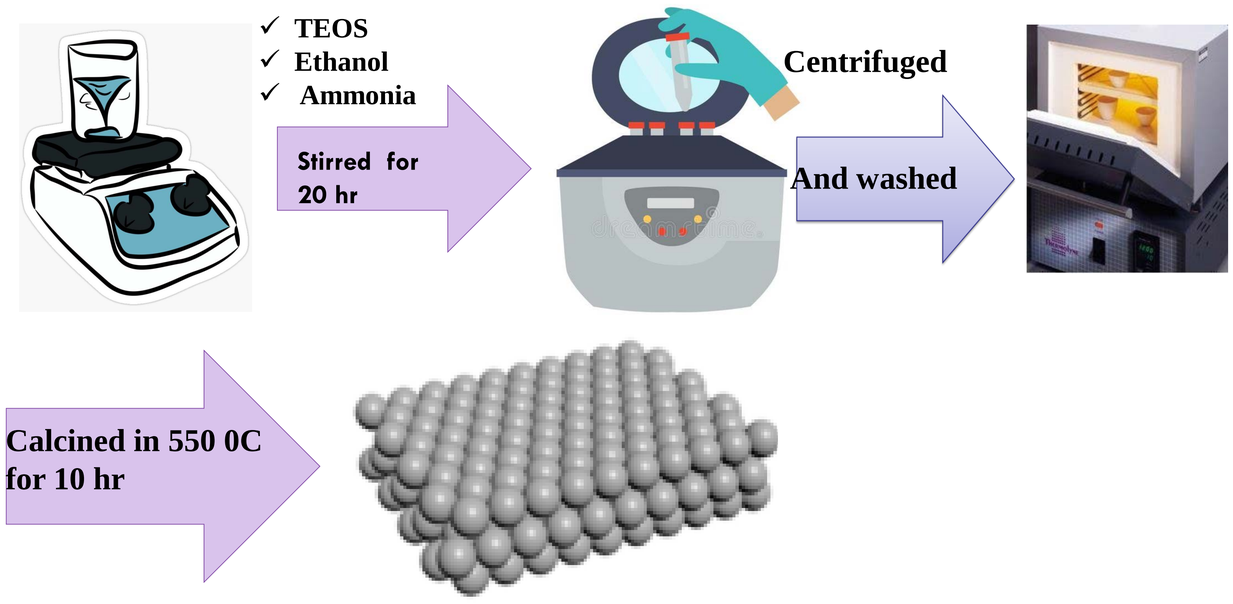
[1]Department of Civil and Environment Engineering, University of Ulsan, Republic of Korea *Corresponding author: B.-K. Lee (bklee@ulsan.ac.kr)

Introduction

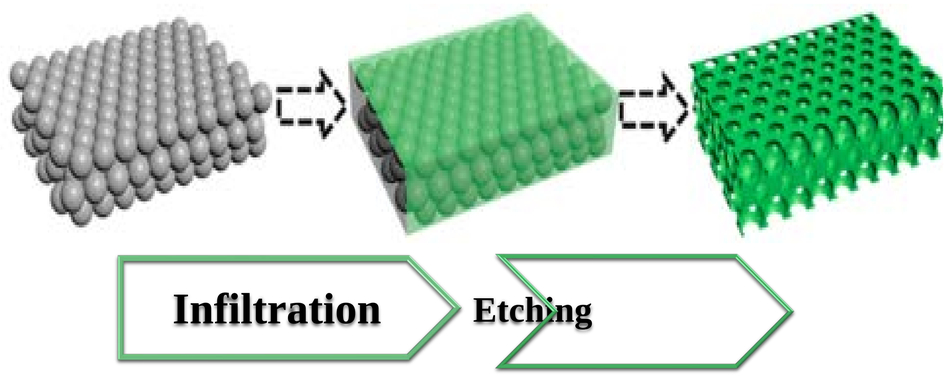
- Non-biodegradable or persistent organic pollutants adversely impact on water, human health and ecosystem
- Photocatalytic oxidation is a very powerful technology cab be used in paints to convert most of the pollutants into harmless CO2 and water.
- In this work, S-doped C3N4 has been synthesized by two methods in different sizes and the degradation results has been demonstrated in regard to best size.

Methods

1) preparing SiO2 Template with Stober's method



3) Preparation of IO C3N4



Results

✓ Characterization results

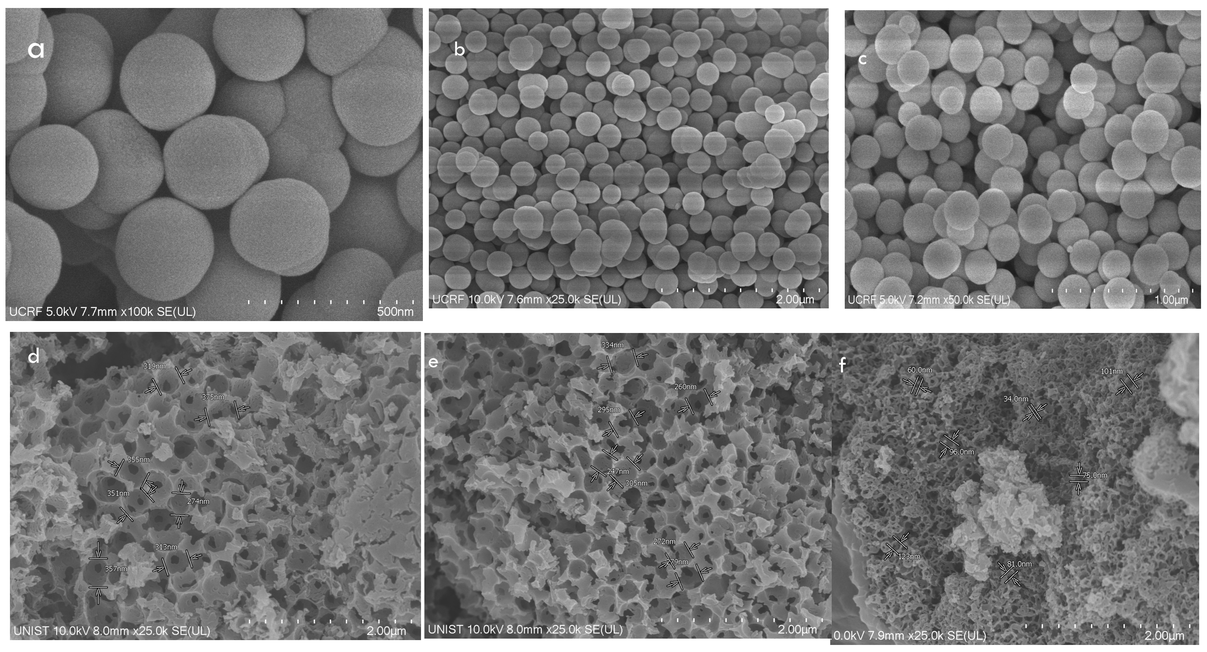


Fig.1. SEM image of a)SiO2-size1 and b) SiO2-size2, and c) SiO2-size3 , and IO C3N4 synthesized from melamine with SiO2 d)size1 e)size 2f)size 3

✓ Characterization results

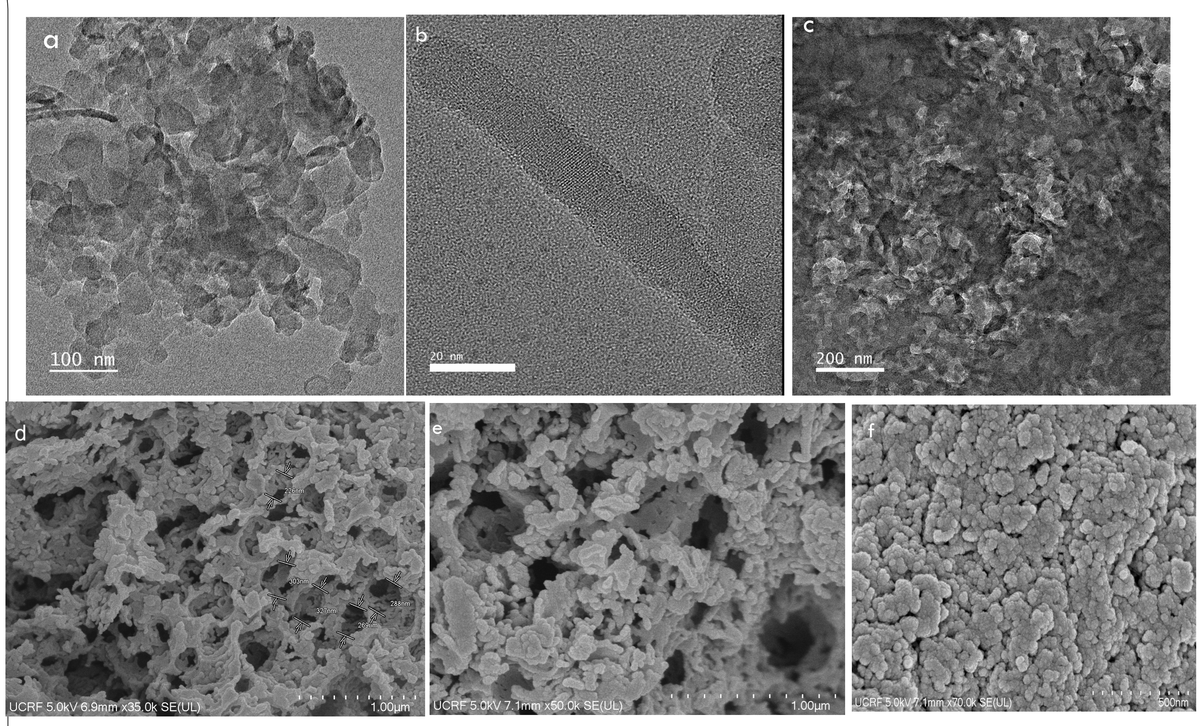


Fig.2. HR-TEM a)Bulk C3N4 and b)C3N4 synthesized from thiourea , and c) C3N4 IO synthesized from thiourea and SEM of) C3N4 IO synthesized from thiourea d)size1 and , e) size 2 and , f) size 3

✓ Photocatalytic performance

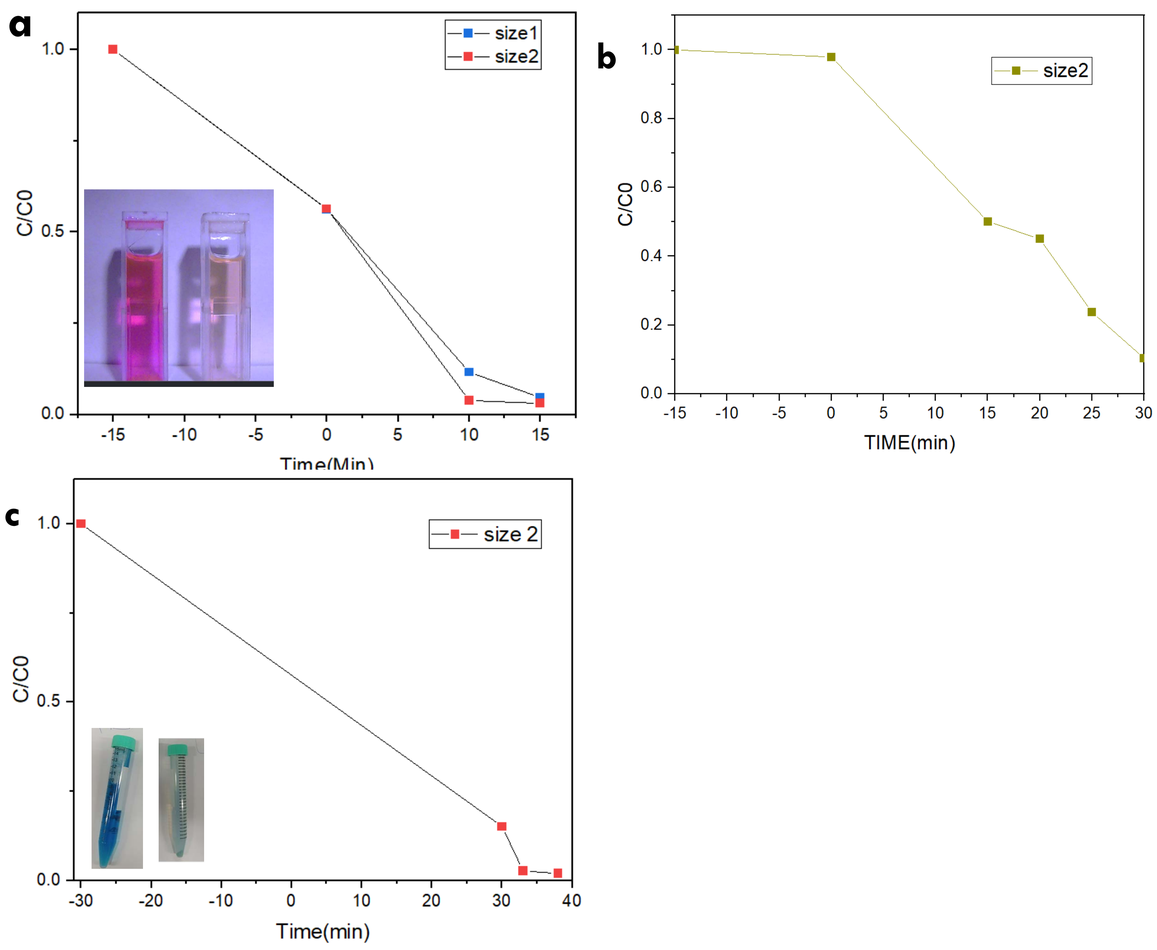


Fig. 3. a) RhB degradation by IO C3N4 with thiourea precursor and , b)RhB degradation by IO C3N4 with melamine precursor, c) MB degradation

Conclusions

- Size of catalyst and precursor of C3N4 both together, would impact morphology and performance of catalyst.
- Size 2 of SiO2 template have the best performance in degradation pollutants.

Acknowledgement

This results was supported by "Regional Innovation Strategy (RIS)" through the National Research Foundation of Korea (NRF) funded by the Ministry of Education (MOE) (2021RIS-003)