

# PRECURSOR-REFORMING SYNTHESIS OF MESOPOROUS $g\text{-C}_3\text{N}_4$ FOR PHOTOCATALYTIC DESTRUCTION OF ORGANIC DYE AND PHARMACEUTICALS

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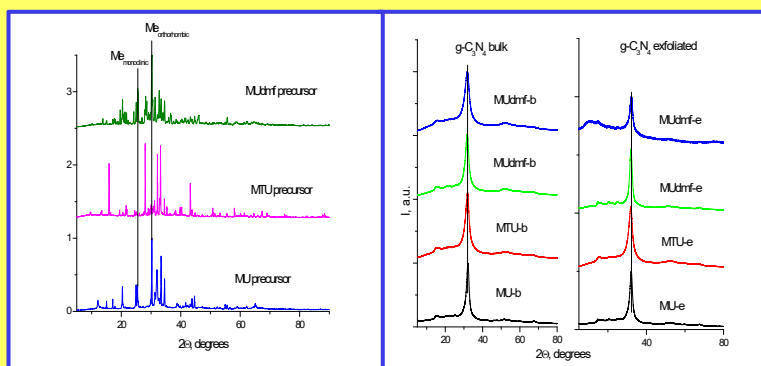
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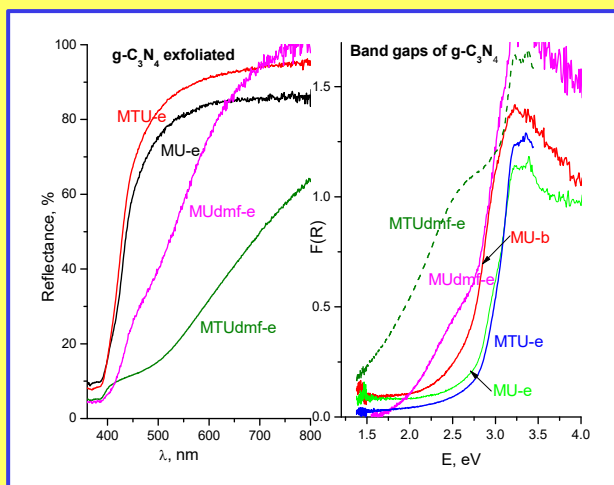
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Here we describe a novel precursor reforming strategy that ultimately affords mesoporous  $g\text{-C}_3\text{N}_4$  materials with red shifted light absorption edge. The precursor synthesis was performed by hydrothermal treatment of mixtures melamine (M) with urea (U) or thiourea (TU) in aqueous or DMF medium. It was confirmed that hydrothermal treatment of melamine and urea (thiourea) causes an irreversible melamine monoclinic to orthorhombic phase transformation. The calcination of the mixture of orthorhombic melamine and urea (thiourea) yielded mesoporous  $g\text{-C}_3\text{N}_4$  with enhanced photoabsorption properties.

## Structure study



## Optical properties study



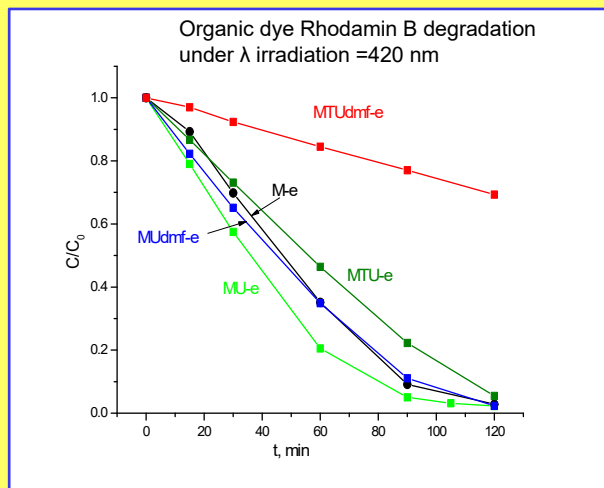
## Texture study

	SSA, $\text{cm}^2\text{g}^{-1}$	Cumulative pore volume, $\text{cm}^3\text{g}^{-1}$	Volume adsorbed $\text{N}_2$ at $P/P_0=1$ , $\text{cm}^3\text{g}^{-1}$
MU-b	49	0.03	162
MU-e	215	0,59	819
MUdf-b	30	0.12	195
MUdf-e	526	1.4	1781
MTUdf-b	5	0.01	86
M-e	180	0.49	597

## Elemental analysis

	content, at. %				N/C atomic ratio
	C	N	H	O	
MUdf-b	34.93	2.18	61.0	1.89	1.50
MUdf-e	34.56	2.49	60.95	2.0	1.51
MTU-b	34.47	2.27	60.35	2.91	1.50
MTUdf-b	35.38	2.19	59.87	2.56	1.45

## Photocatalytic activity study



## Conclusions

- The precursor reforming strategy was implemented to synthesize the mesoporous  $g\text{-C}_3\text{N}_4$  materials with red shifted light absorption edge.
- The hydrothermal treatment of melamine mixtures with urea causes the transformation of melamine from monoclinic to orthorhombic phase in aqueous and DMF medium.
- In the case of hydrothermal treatment of melamine and thiourea mixture in aqueous medium the precursor consist of melamine and ammonium thiocyanate. The thermal treatment this mixture in DMF medium causes the hydrazinecarbothioamide formation.
- The calcination of thiourea derivated precursors at 550 °C. results in  $g\text{-C}_3\text{N}_4$  with strongly red shifted light absorption edge.
- The highest activity in the dye degradation was observe for  $g\text{-C}_3\text{N}_4$  obtained from precursor containing orthorhombic melamine.

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