



**H.P. Council for Science, Technology & Environment (HIMCOSTE)**  
**RESEARCH PROJECT PROFORMA FOR MONITORING PROGRESS**

(To be submitted on or before 31.12.2020)

1. Name & address of the PI & Co-PI: **PI Dr. Pankaj Raizada &  
Co-PI Dr. Pardeep Singh  
School of Advanced Chemical Sciences,  
Shoolini University of Biotechnology and  
Management Sciences,  
Bajhol, Solan (HP) 173229**
  
2. Project Code: **HIMCOSTE (R&D)/2019-20-2.5(4)**
  
3. Project Title: **Fabrication of graphitic carbon nitride based magnetic adsorbent  
and photocatalyst for water soluble industrial effluent treatment.**
  
1. Number & Date of Sanction Letter: **No.- STC/F(8)-6/2019(R&D 2019-20)-397  
Dated- 24-06-2020**
  
2. Total Outlay of the Project: **Total allocation (2 years) = Rs. 6,08,000**

S.No.	Head	1 <sup>st</sup> year (in Rs.)	Total (in Rs.) 2 years
1.	Remuneration	1,44,000	2,88,000
2.	Consumables	1,00,000	2,00,000
3.	Travel	10,000	20,000
4.	Others	50,000	1,00,000
	Total	3,04,000	6,08,000

3. Project Duration Details: **2 Years**
  - (a) Date of Start: **28-Jul-2020**
  - (b) Date of Completion: **July 2022**



4. (a) Activities and Outputs achieved/targeted for the year 2020-21

Objective wise	Activity	Number of activities envisaged to be completed	Targets achieved
1. 1-6 months	1. Procurements of chemicals and low value equipment. Recruitment of JRF. Preliminary study on the preparation of KPCN.	-KPCN/GO/ MFe <sub>2</sub> O <sub>4</sub> .  -Preliminary result.  -Effect of experimental parameters on morphological and structural properties of magnetic photocatalyst.	All targets Achieved, except characterization of synthesized materials and collection of effluents samples from BBN belt in Solan district.
	2. Preparation and Characterization of KPCN/GO/MFe <sub>2</sub> O <sub>4</sub> .		
	3. Collection and preliminary analysis of effluents samples from various discharge points in BBN belt in Solan district.	- Identification of main pollutants present in industrial effluents persisting in BBN belt.	
2. 7-12 months	1. Evaluation of photocatalytic activity of KPCN/GO/MFe <sub>2</sub> O <sub>4</sub> .	-Effect of experimental parameters on morphological and structural properties of KPCN/GO/MnFe <sub>2</sub> O <sub>4</sub> .	Targets yet to achieve
	2. Optimization of reaction conditions.		
	3. Investigation of kinetics of photocatalytic process-i.	- Exploration of kinetics of photocatalytic process.	

5. **If shortfall/addition, reasons for the same:** Characterization of samples is delayed because the required institutes (e.g. IIT Mandi etc.) were not accepting the samples for characterization due to this COVID crisis. Samples are ready, we will get the work done as soon as possible. Also, effluent samples will be collected as soon as the characterization results will be achieved.




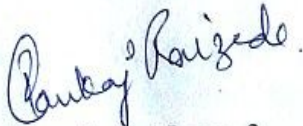
6. (a) Funds released vis-à-vis utilized (cumulative)- since the date of sanctioning of project

	<b>Receipt</b>	<b>Expenditure</b>	<b>Balance</b>
Emoluments	894	Rs. 44,877	Rs. 99,123
Equipments	-	-	-
Consumables	894	Rs. 16,674	Rs. 83,326
Travel	894	NIL	Rs. 10,000
Contingencie	-	-	-
Any Other	894	NIL	Rs. 50,000

7. **Remarks: -**

It is hereby certified that all the information provided above are correct and true to the best of my knowledge.

  
Signature, Name &  
Stamp of Co-PI  
Dr. Pardeep Singh

  
Signature, Name &  
Stamp of PI  
Dr. Pankaj Raizada

  
Signature, Name &  
Stamp of Head of  
Organisation/Institution  
Registrar  
Shoolini University of Biotechnology  
& Management Sciences  
Solani (H.P.)



## Progress Report

### Fabrication of graphitic carbon nitride based magnetic adsorbent and photocatalyst for water soluble industrial effluent treatment

1. Potassium and phosphorus co-doped graphitic carbon nitride (KPCN) has been synthesized.
2. Graphitic carbon nitride based ternary composite using KPCN, graphene oxide (GO), and metal ferrite ( $MFe_2O_4$ ) has been synthesized. ( $M = Ca, Mg, Co \& Zn$ )

1. **Preparation of phosphorus doped graphitic carbon nitride (PCN):** Phosphorus doped graphitic carbon nitride has been synthesized by following steps:

**Step-I:** 0.3 g dicyandiamide + 15 mL deionized water + stirring

**Step-II:** 0.3 g  $(NH_4)_2PO_4$  was added to above solution + heat at  $100^\circ C$

**Step-III:** Dried at  $100^\circ C$  + milling and annealing at  $400^\circ C$  for 4 hours to obtain PCN

2. **Preparation of phosphorus and potassium co-doped graphitic carbon nitride (KPCN):** Phosphorus and potassium doped graphitic carbon nitride (KPCN) has been prepared by following steps:

**Step-I:** PCN + 20 mL deionized water + stirring

**Step-II:** Appropriate amount of KCl was added + heated at  $100^\circ C$

**Step-III:** Dried at  $100^\circ C$  + milling and annealing at  $400^\circ C$  for 2 hours to obtain KPCN

3. **Preparation of KPCN/GO/ $MFe_2O_4$  ternary composite:** KPCN/GO/ $Fe_2O_4$  has been prepared by following steps:

**Step-I:** Calculated amount of KPCN and GO + 50 mL of distilled water + ultrasonication for 2 hours

**Step-II:** 4.0 g of  $Fe(NO_3)_3 \cdot 9H_2O$  + 1.5 g of  $M(NO_3)_2 \cdot 6H_2O$  + 20 mL distilled water + KPCN/GO dispersion + Stirred at room temperature for 30 minutes + NaOH (1M) to adjust the pH at  $\sim 10.0-11.0$  + stirred for 6 hours

**Step-III:** Mixture was heated at  $180^\circ C$  for 12 hours + washed with distilled water and ethanol + dried at  $80^\circ C$  to obtain KPCN/GO/ $MFe_2O_4$





**Shoolini University**  
Of Biotechnology & Management Sciences Solan  
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Contact : 01792-352002  
E-Mail : accounts@shooliniuniversity.com

**Receipt Voucher**

No. : 894

Dated : 28-Jul-2020

Particulars	Amount
<b>Account :</b> Grant Fabrication of --Treatment Dr. PankajHIMCOSTE	<b>3,04,000.00</b>
<b>Through :</b> PNB FEE A/c 0433000100728136	
<b>On Account of :</b> NEFT_IN:SBIN420210486362/ HIMCOSTE Project Name "Fabrication of graphitic carbon nitride based magnetic absorbent and photocatalyst for water soluble effluents treatment - Reg. Dr. Pankaj raizada	
<b>Amount (in words) :</b> INR Three Lakh Four Thousand Only	
	<b>₹3,04,000.00</b>

SHOOLINI UNIV  
Authorised Signatory  
*[Signature]*