



***Assoc. Prof. Tuba ERDOGAN BEDRİ***  
***Chief Researcher***  
***TUBITAK MAM***  
***Institute of Chemical Technology***  
***tuba.bedri@tubitak.gov.tr***



T.C. SANAYİ VE  
TEKNOLOJİ BAKANLIĞI



TÜBİTAK



TÜBİTAK

MAM



TÜBİTAK

SAGE



TÜBİTAK

ULAKBİM



TÜBİTAK

UZAY



TÜBİTAK

TUG



TÜBİTAK

BUTAL



TÜBİTAK

MARTEK



TÜBİTAK

TÜSSİDE



TÜBİTAK

UME



TÜBİTAK

RUTE



TÜBİTAK

BİLGEM

ANKARA

ANTALYA

BURSA

KOCAELİ - GEBZE

OUR  
POSITION  
IN  
TUBITAK  
FAMILY



## INSTITUTES



**ENVIRONMENT AND  
CLEANER  
PRODUCTION**



**ENERGY**



**GENETIC  
ENGINEERING AND  
BIOTECHNOLOGY**



**FOOD**



**CHEMICAL  
TECHNOLOGY**



**POLAR RESEARCH**

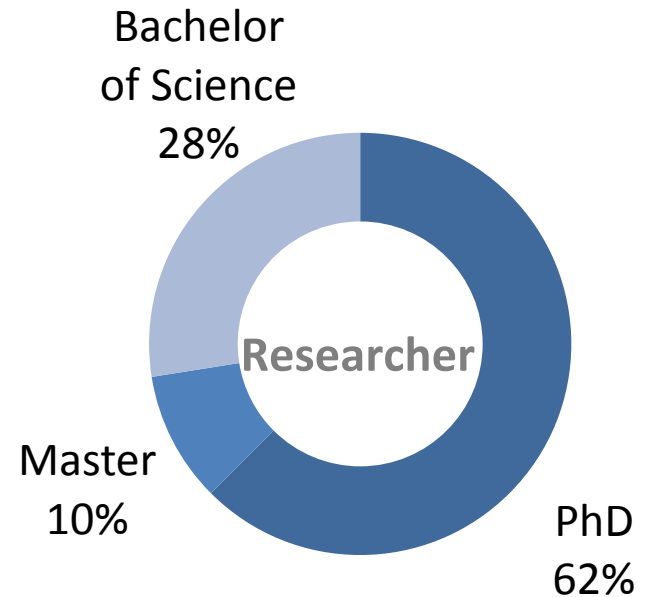
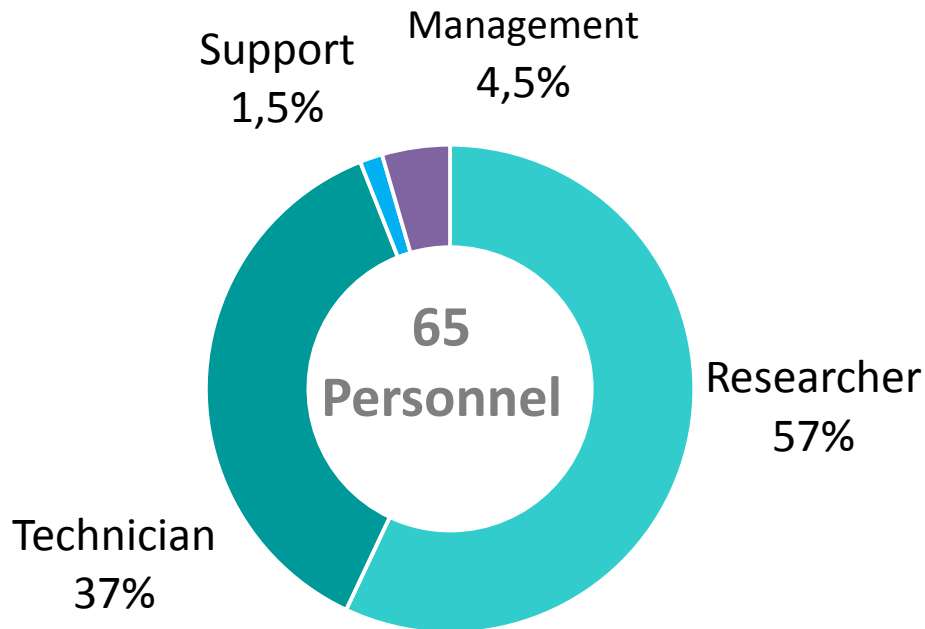


**MATERIALS**



**EARTH AND MARINE  
SCIENCES**

### Human Resources



+9 Scholarship Student

# TUBITAK MAM

## Institute of Chemical Technology

### ADVANCED POLYMER TECHNOLOGY

- ✓ Advanced Polymeric Materials
- ✓ Polymer (Nano)Composites
- ✓ Polymer membranes

### DEFENCE&SECURITY TECHNOLOGIES

- ✓ Energetic Materials
- ✓ CBRN-e Defence Technologies

### PROCESS TECHNOLOGIES

- ✓ Process Development
- ✓ Recycling Processes
- ✓ Production in Pilot Plants
- ✓ Installation of Industrial Facilities

### LIFE SUPPORT SYSTEMS

- ✓ Gas Adsorbant Systems
- ✓ Gas Separation Systems
- ✓ Chemical O<sub>2</sub> Producer
- ✓ O<sub>2</sub> and N<sub>2</sub> Enriching Agents

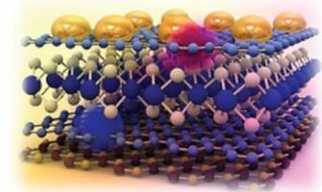
### MEDICAL TECHNOLOGIES

- ✓ Synthesis of Drug Active Ingredient
- ✓ Traditional Herbal Medical Products
- ✓ Drug Formulation and Production

RESEARCH  
AREA

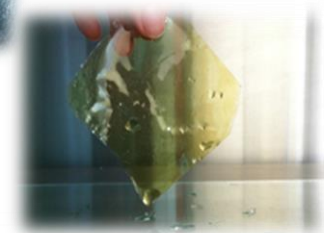
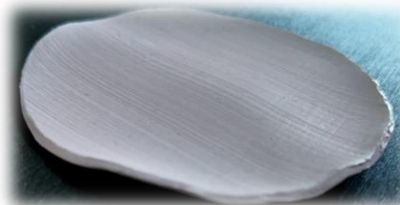


# Advanced Polymers Research Group



## ❑ Advanced Polymer Composites

- Thermal conductive polymer nanocomposites for thermal management
- High Performance Resins
  - Thermoset and thermoplastic resin design
  - Fiber desizing/resizing technology
  - Hot-melt prepreg production

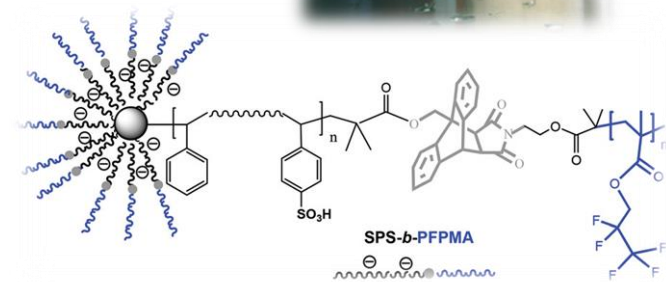


## ❑ Polymer Membran Technology

- Proton conducting polymer membranes
- Selective permeable polymer membranes

## ❑ Macromolecular Engineering

- Synthesis of well-defined polymer structures having different topologies

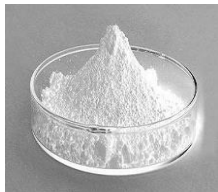


# Advanced Polymers Research Group

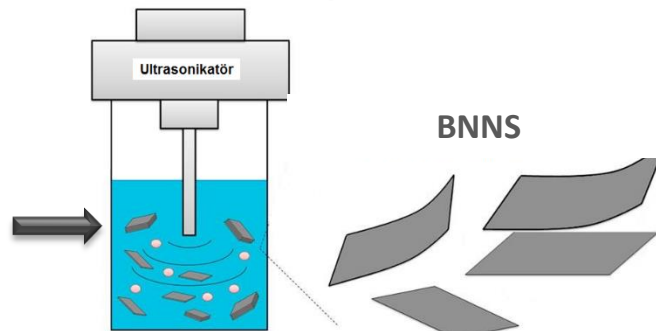
## Thermal Conductive Polymer Nanocomposites

### *h-BN Nanosheet (BNNS) Production and Chemical Modification of BNNS*

#### Liquid Exfoliation

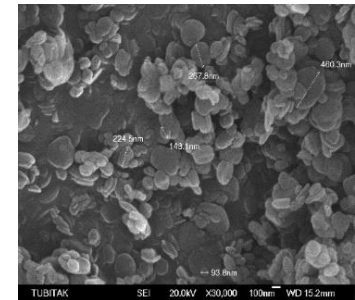
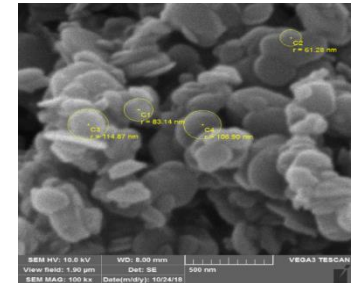
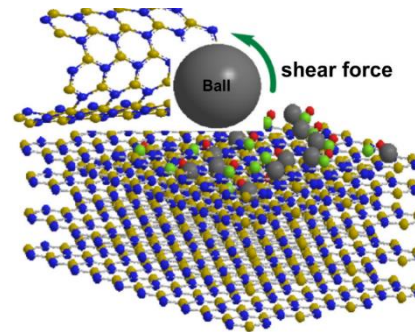


h-BN  
d=200-450 nm

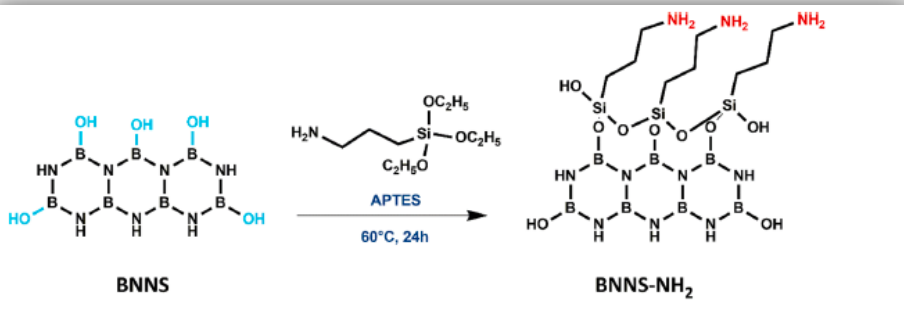


d=50-120 nm, crystal size: 11,5 nm)

#### Mechanical Exfoliation



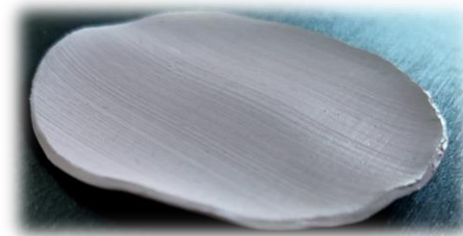
#### Chemical Modification of BNNS



*Composites: Part A, 146 (2021), 106406*

# Advanced Polymers Research Group

## Thermal conductive polymer nanocomposites for thermal management



### Thermal Interface Materials

#### Product Specification

- Thickness of boron nitride nanosheet:  $<10$  nm
- Thermal Conductivity: 0,8-1,2 W/mK, Electrical resistance:  $2-4,5 \times 10^{16}$  ohm.cm
- Thermoplastic matrix
- High interface compatibility

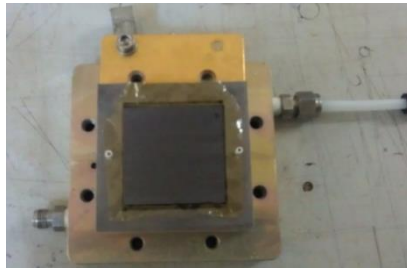
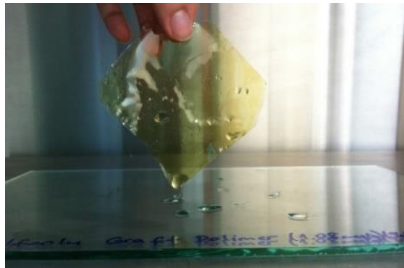
*Composites: Part A, 146 (2021), 106406*



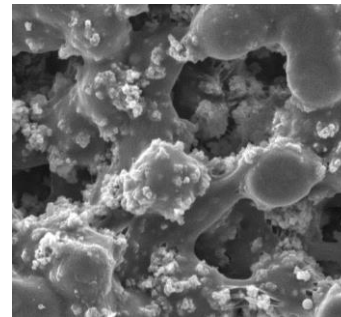
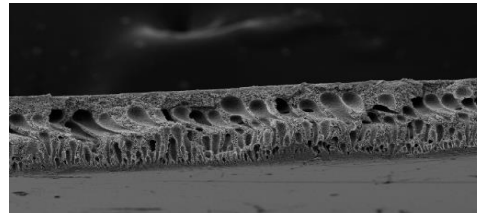
# Advanced Polymers Research Group

## Functional Nanoporous/Microporous Flat Sheet Membranes

### Proton conducting polymer membranes



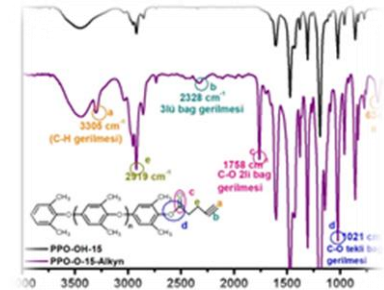
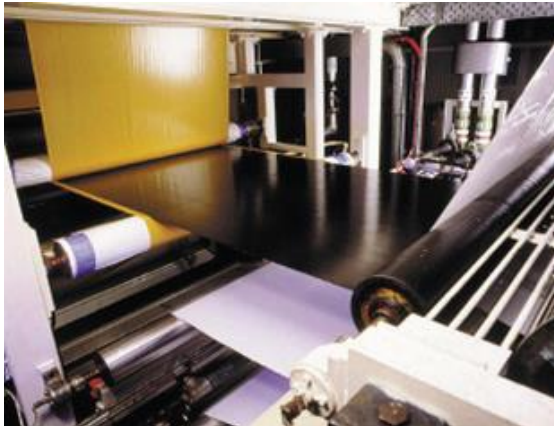
### Selectively permeable polymer membranes



# Advanced Polymers Research Group

## High Performance Thermoset Resins

- Thermoset resin design and synthesis
- Cure kinetics and rheology characterization of the resins for prepreg applications
- Different surface treatments of carbon fibers



# Project Idea

## Advanced polymer research group can participate in following call topics:

- HORIZON-CL4-2022-RESILIENCE-01-10: Innovative materials for advanced (nano)electronic components and systems (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-12: Functional multi-material components and structures (RIA)
- HORIZON-CL4-2022-RESILIENCE-01-14: Membranes for gas separations - membrane distillation (IA)
- HORIZON-CL4-2022-RESILIENCE-01-23: Safe- and sustainable-by-design organic and hybrid coatings (RIA)



This project is co-financed by the  
European Union and the Republic of Turkey  
Bu proje Avrupa Birliği ve Türkiye Cumhuriyeti tarafından  
finanse edilmektedir

**Tuba ERDOGAN BEDRİ**  
**TUBITAK MAM**  
**Institute of Chemical Technology**  
**Turkey**  
**+902626773889**  
*tuba.bedri@tubitak.gov.tr*  
[www.mam.gov.tr](http://www.mam.gov.tr)