

# ADVANCED MATERIALS AND DEVICES LABORATORY COLLABORATION WITH THE INDUSTRIAL SECTOR

Advanced Materials and Devices Laboratory (AMDE Lab) principally focus on the development of high-tech materials, fundamental studies of material properties, organizing educational scientific events including lectures and workshops, and nurture collaborations with Universities, research centers and industry partners. We are based in Physics Department of Aristotle University of Thessaloniki and have established a significant new technology presence in the country.

Key aspects of the research conducting in AMDE Lab are:

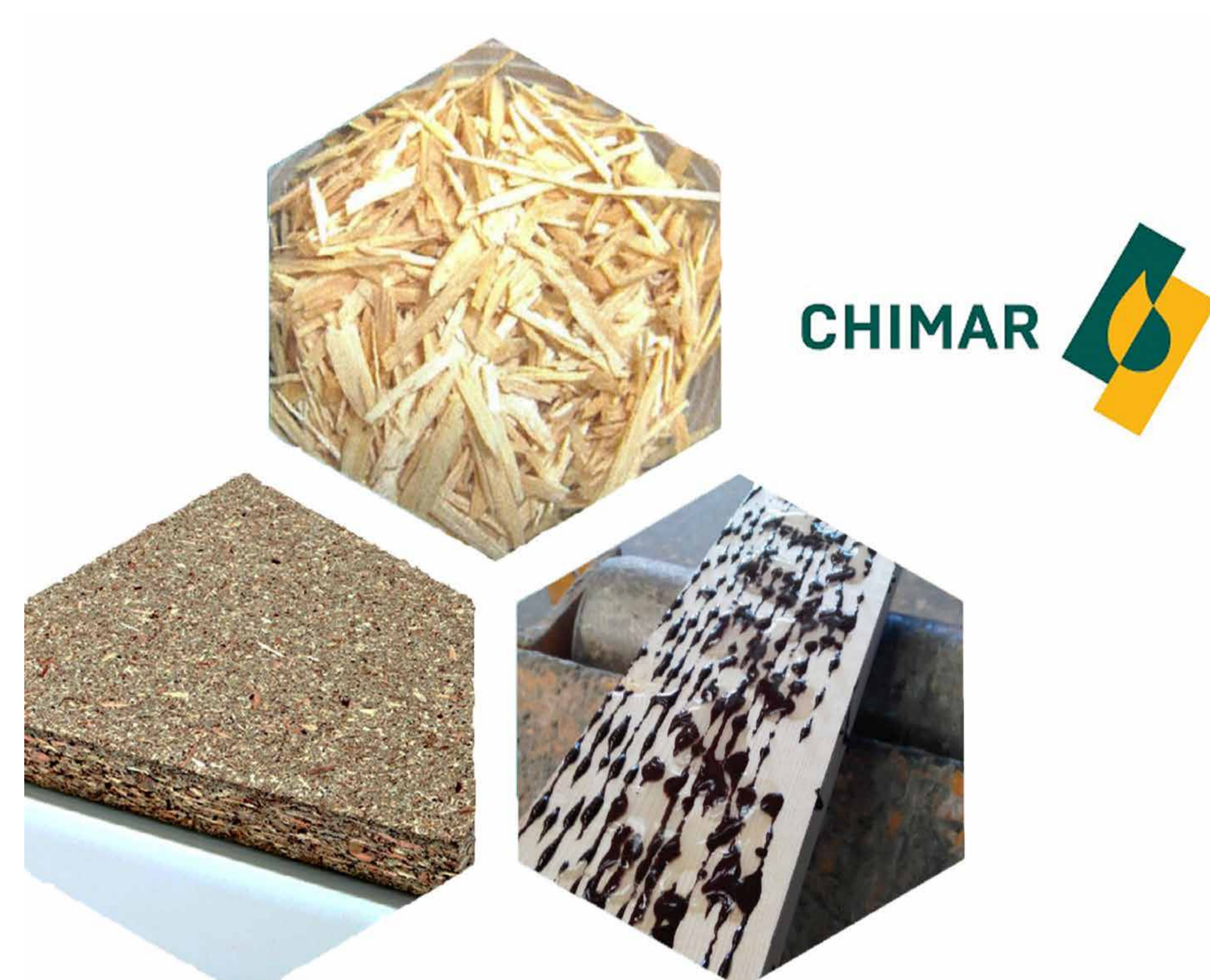
1. Formation and synthesis of high-tech materials.
2. Structural and chemical state characterization using X-ray methods.
3. Optical Properties and Spectroscopy.
4. Thermal analysis.
5. Morphological characterization and elemental analysis of materials and surfaces.

## ADVANCED MATERIALS AND DEVICES LABORATORY (AMDE LAB)



Head of the Laboratory Konstantinos Chrissafis

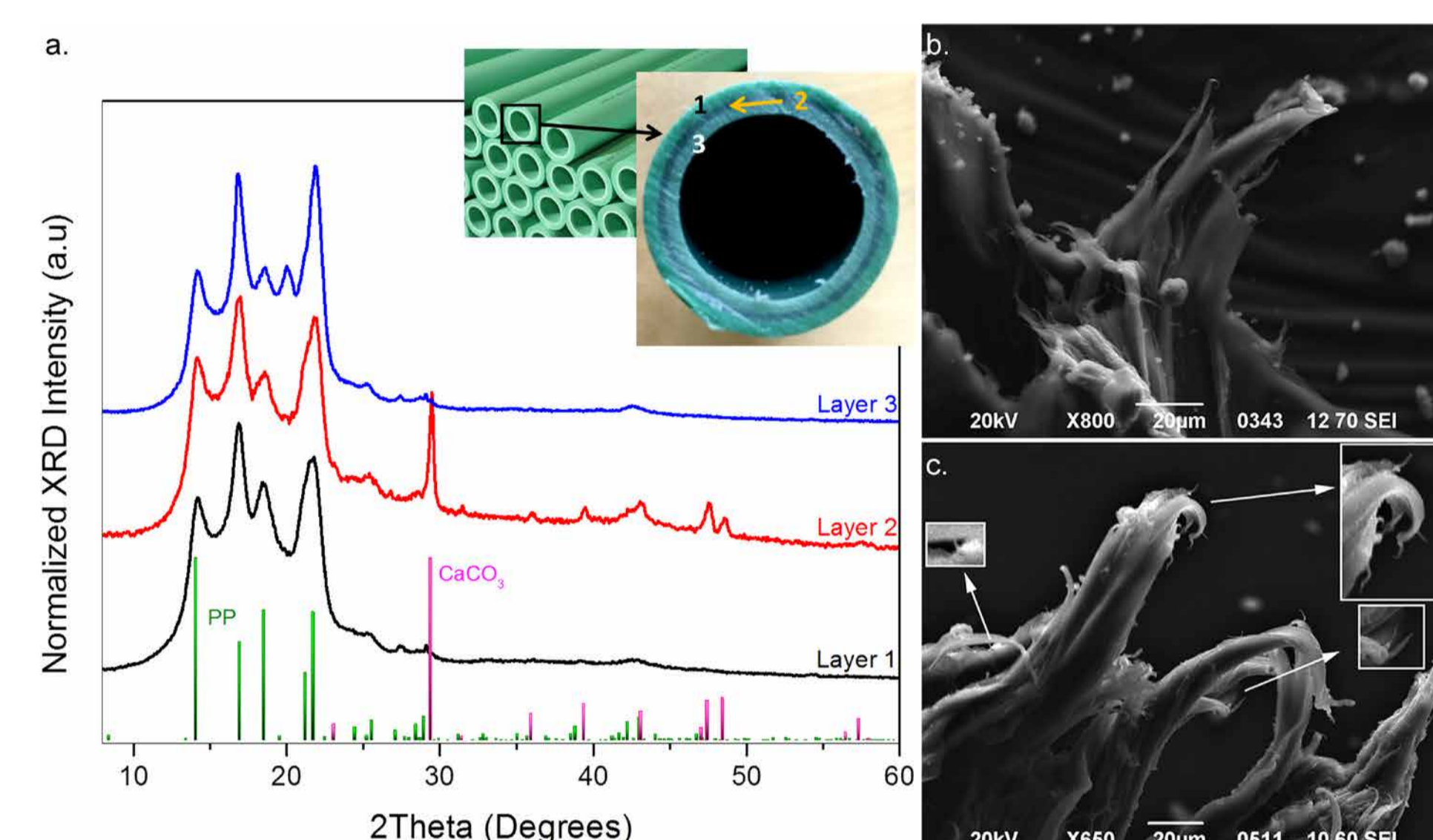
Members of the Lab/Research Team George Vourlias, Eleni Pavlidou, Evangelia Delli, Iouliana Chrysafi, with additionally 4 Post-Doctoral and 10 PhD students



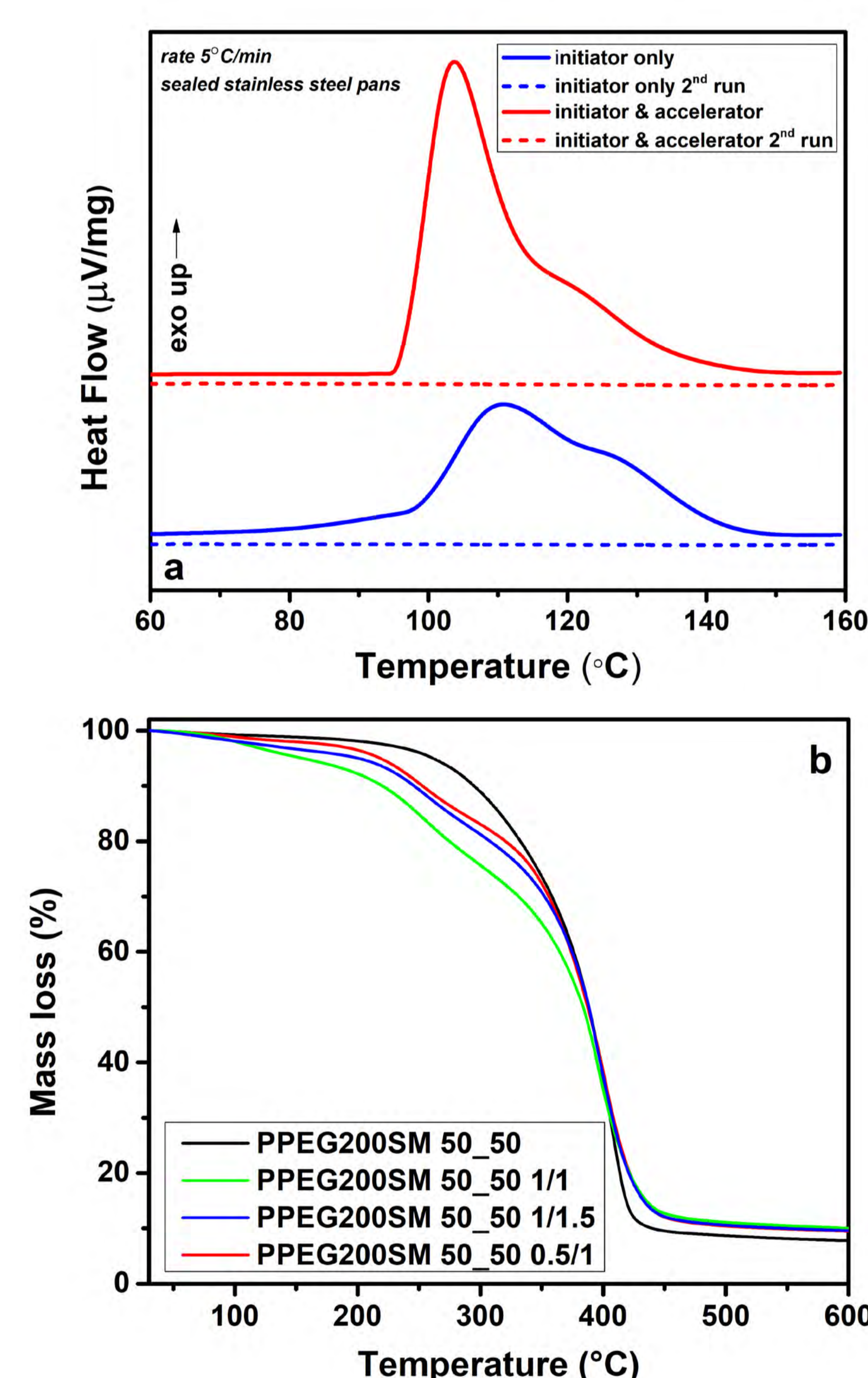
**Figure 1:** CHIMAR specializes on the development of state-of-the-art binder and hardener products and supplies various wood-based panel industries all around the globe. The main scope of the CHIMAR-AMDe Lab collaboration is the extensive study and optimization of bio-based materials such as resins with equal or higher performance as compared to their commonly used petroleum-based counterparts.



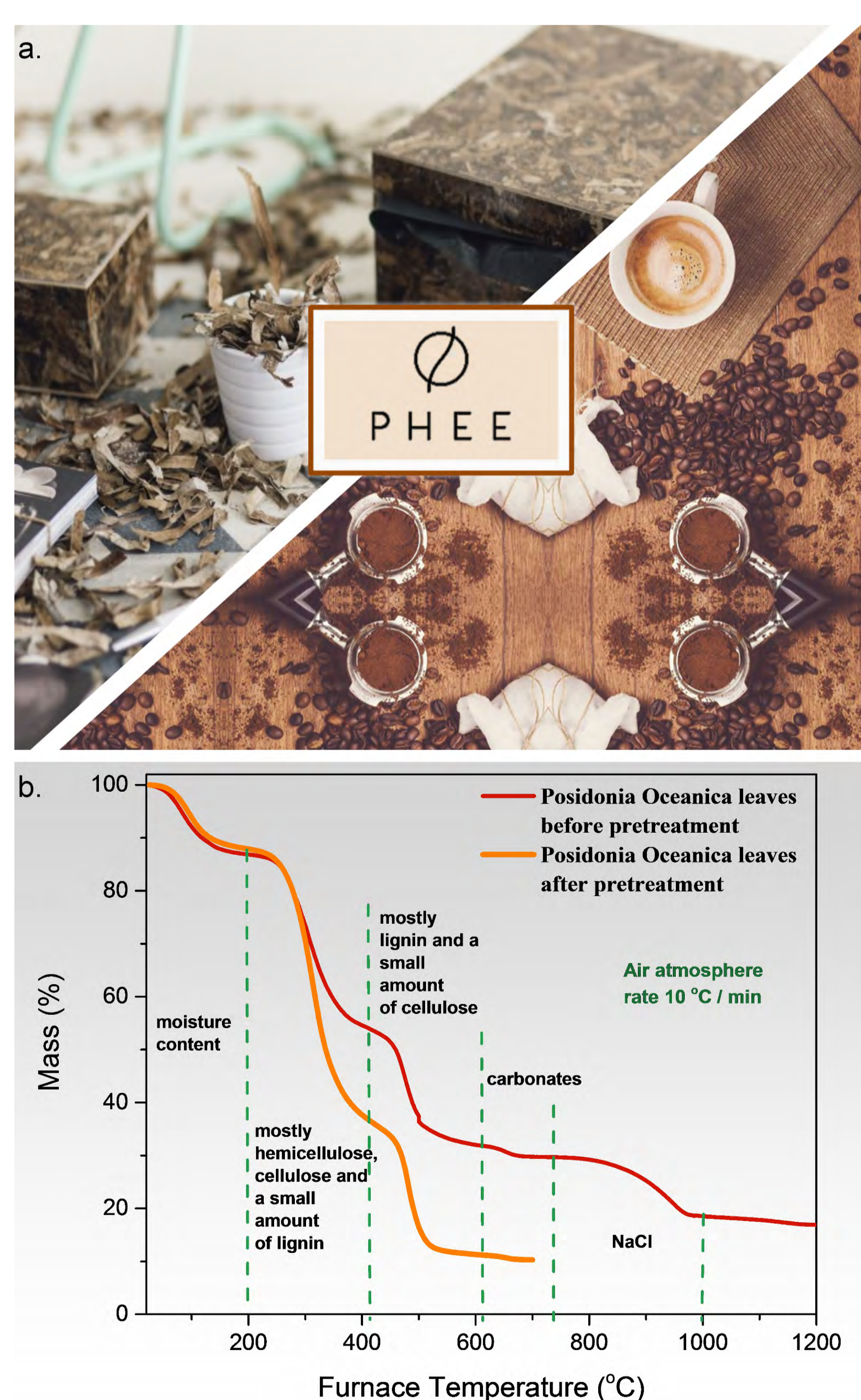
**Figure 3:** Interplast manufactures high quality plastic pipes and fittings for use in water supply, heating and sewerage systems, with a wide range of application in areas such as house construction, technical projects and industrial facilities. Interplast-AMDe Lab collaboration aims to the extensive study and optimization of polymer materials to improve the performance of the final products.



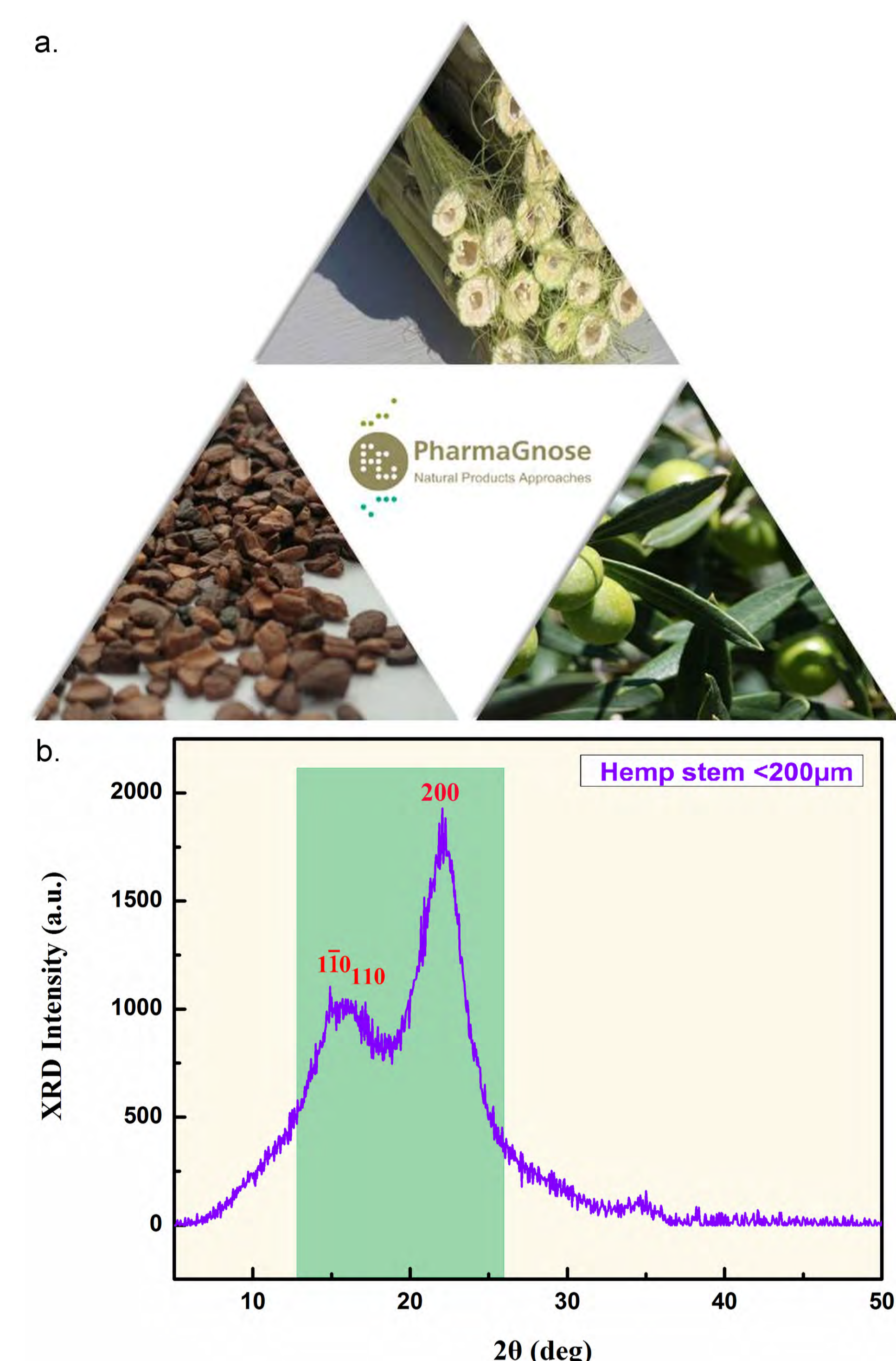
**Figure 4:** (a) XRD measurements of PPR/glass fiber nanocomposites for pipe applications. (b) SEM micrographs of the failure surface of polyethylene/graphene nanocomposites, after tensile testing. Fractography analysis provides useful information on the causes of failure and enables further improving of the mechanical properties of the examined materials.



**Figure 2:** (a) Differential Scanning Calorimetry (DSC) and (b) Thermogravimetry Analysis (TGA) measurements of unsaturated polyester resins derived from a bio-based resource. Thermal characterization provides important feedbacks on the temperature stability and degradation of materials.



**Figure 5:** (a) AMDe Lab is working with PHEE to develop high strength and resistance to failure bio-based particle boards/panels using ecofriendly materials such as seaweed and coffee grounds. (b) TG analysis of the Posidonia Oceanica seaweed leaves.



**Figure 6:** (a) Pharmagnose provides AMDe Lab with ecofriendly materials such as hemp, olive prances and olive leaves as well as residual olive pits which will be used to develop advanced particles boards/plywoods and bio-based adhesives. (b) XRD pattern of hemp stem.

### Contact information

Tel: +30 2310 998 188  
Email: hrisafis@physics.auth.gr  
Web: amdelab.physics.auth.gr



Acknowledgment: These researches have been co financed by the European Union and Greek national funds through the Operational Program Competitiveness, Entrepreneurship and Innovation, under the call RESEARCH – CREATE – INNOVATE.