

Exploring Material Behavior through DSC and TGA: Principles and Applications in Modern Thermal Analysis

Evangelia Tarani, Konstantinos Chrissafis

School of Physics, Aristotle University of Thessaloniki, 54124, Greece

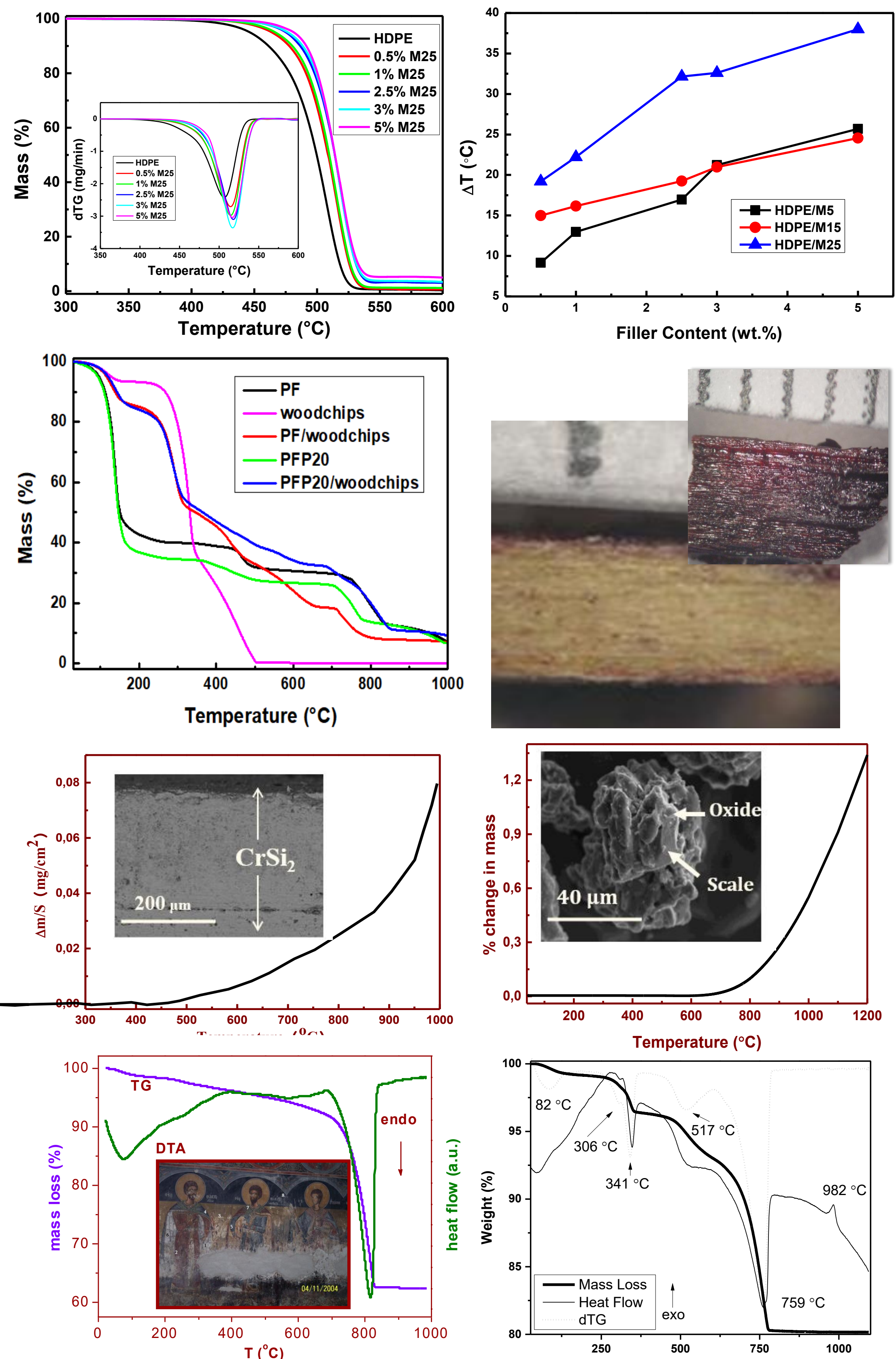
INTRODUCTION & AIM

- ✓ **Thermal analysis techniques** (DSC and TGA) were applied to investigate thermal transitions, degradation behavior, and stability in various materials.
- ✓ **DSC** measured heat flow associated with physical and chemical changes, while **TGA** tracked mass loss under controlled inert or oxidative atmospheres.
- ✓ A **diverse set of materials** was studied, including HDPE/graphene nanocomposites, phenol-formaldehyde resins, CrSi_2 thermoelectric compounds, cultural heritage pigments, and bioactive glass–porcelain composites.

METHOD



RESULTS & DISCUSSION



CONCLUSION

- ✓ **Combined DSC–TGA analysis** offers valuable insights into thermal behavior, aiding material design, process optimization, and conservation efforts.

FUURE WORK

- ✓ **Coupling DSC/TGA** with complementary techniques (e.g., FTIR, XRD, rheology) will enhance understanding of structure–property relationships.