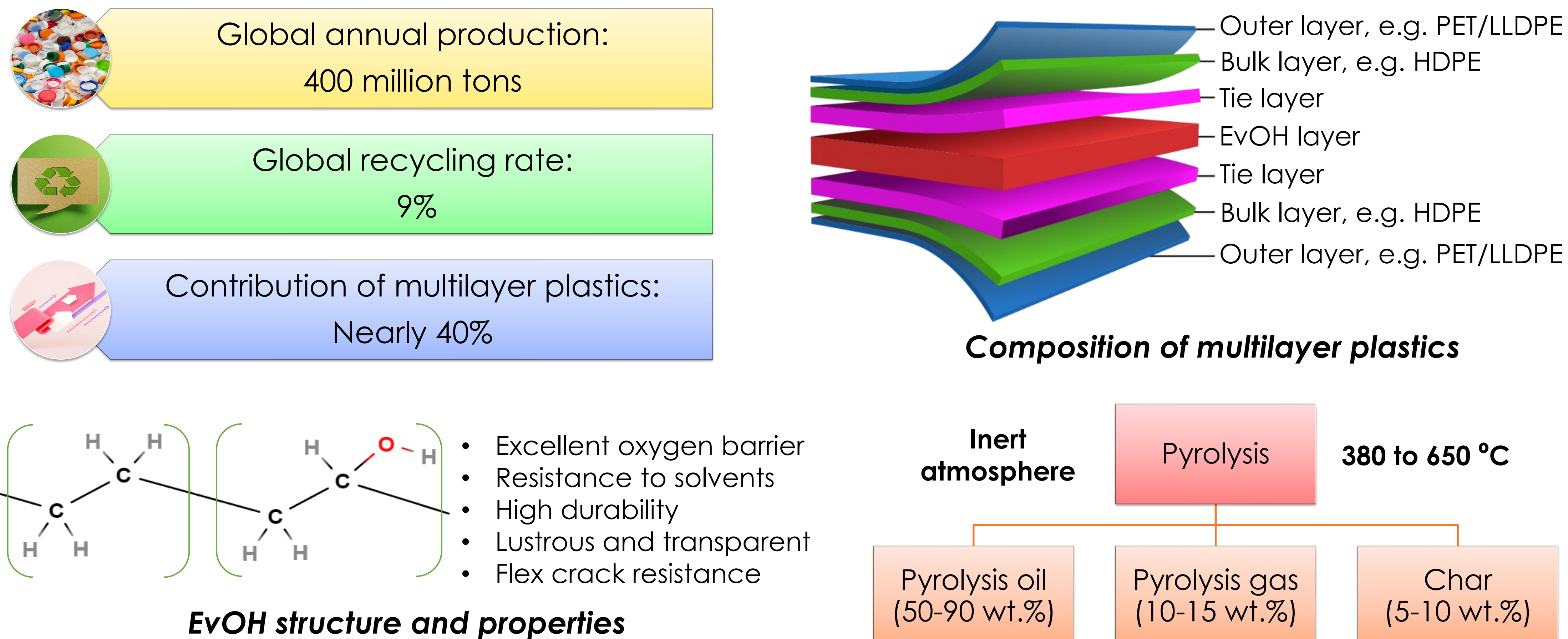


Pyrolysis of Ethylene Vinyl Alcohol (EvOH)

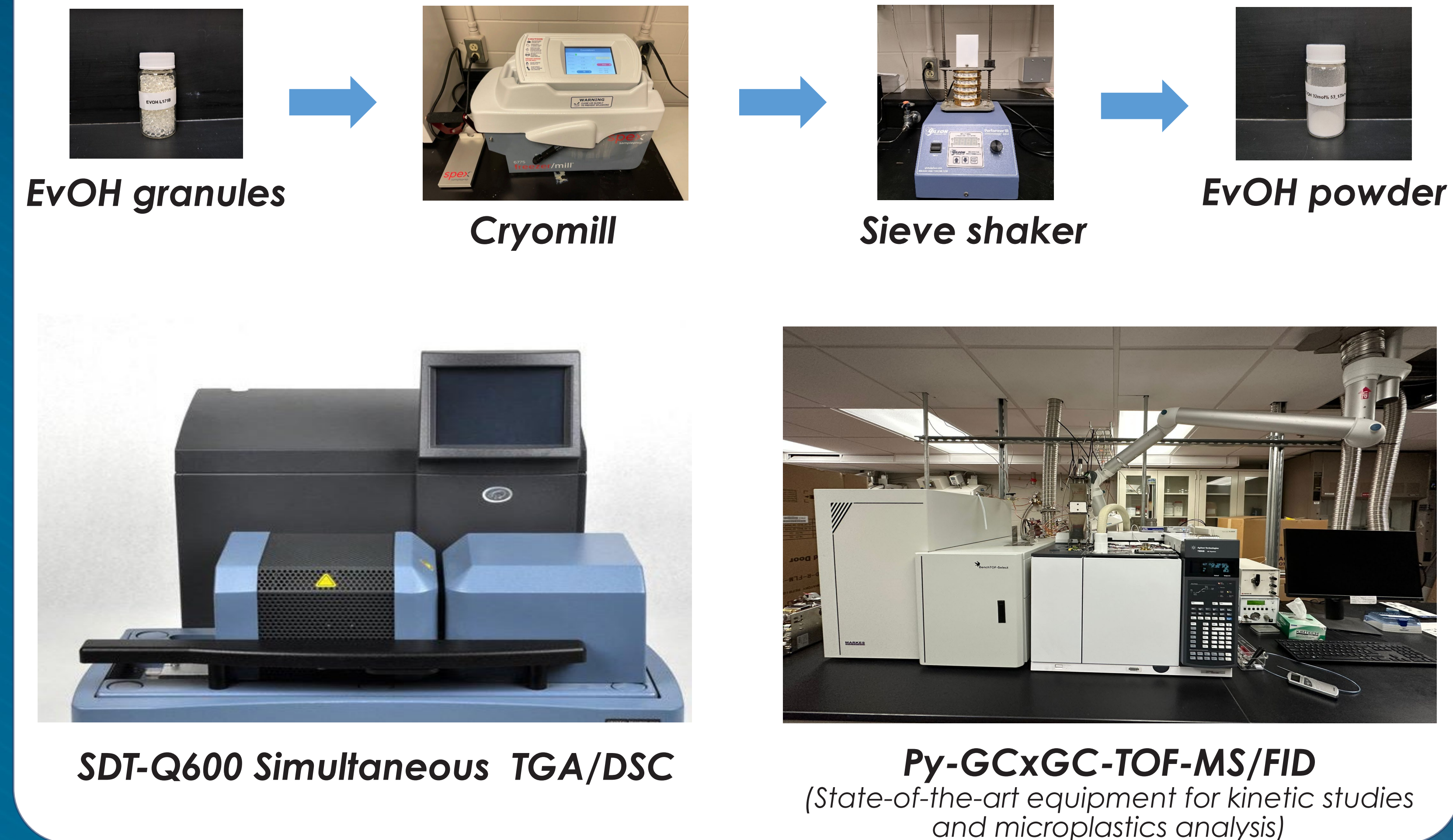
Praneetha Buddha^a, Dr. Hilal Ezgi Toraman^{a,b,c}

Department of Energy and Mineral Engineering^a, Department of Chemical Engineering^b, Institute of Energy and the Environment^c

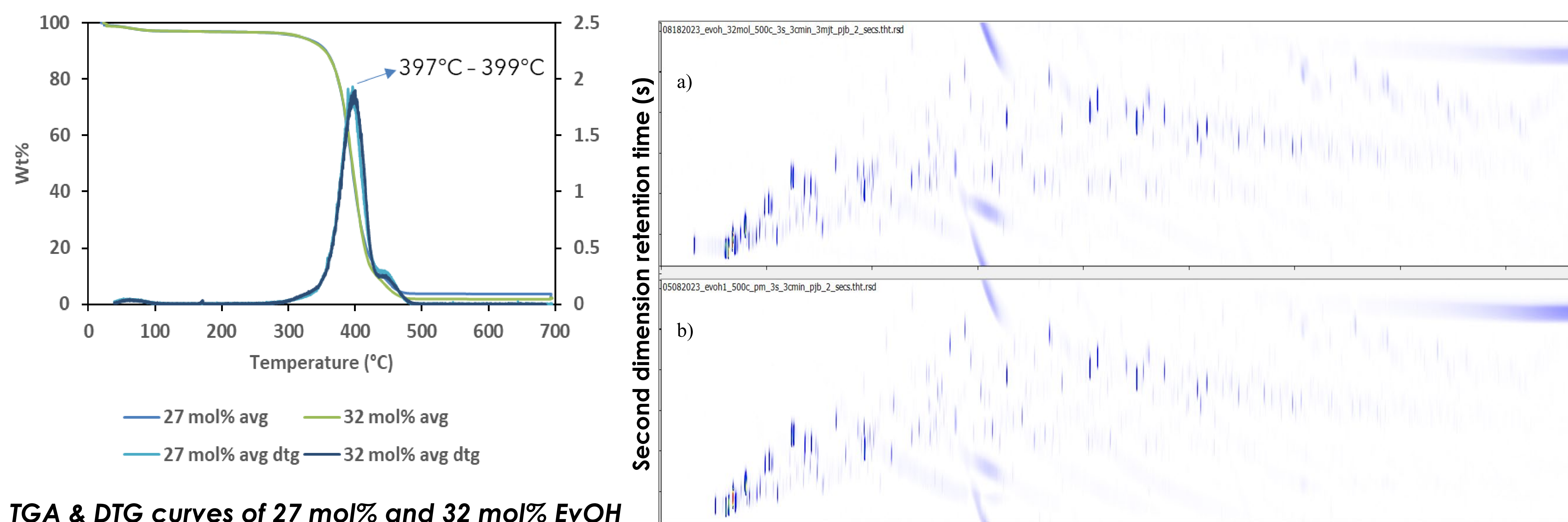
INTRODUCTION



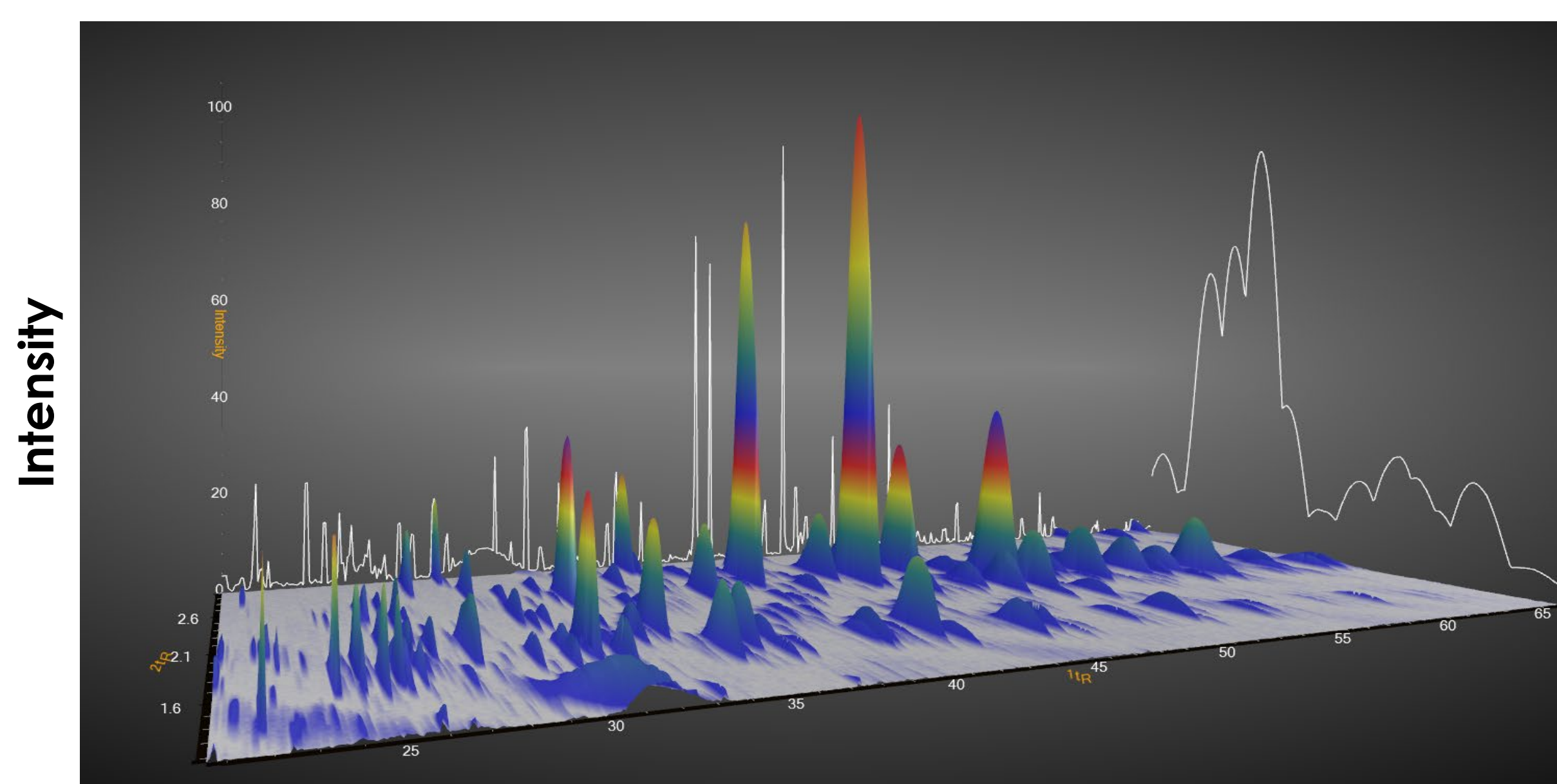
MATERIALS AND METHODS



RESULTS AND DISCUSSION

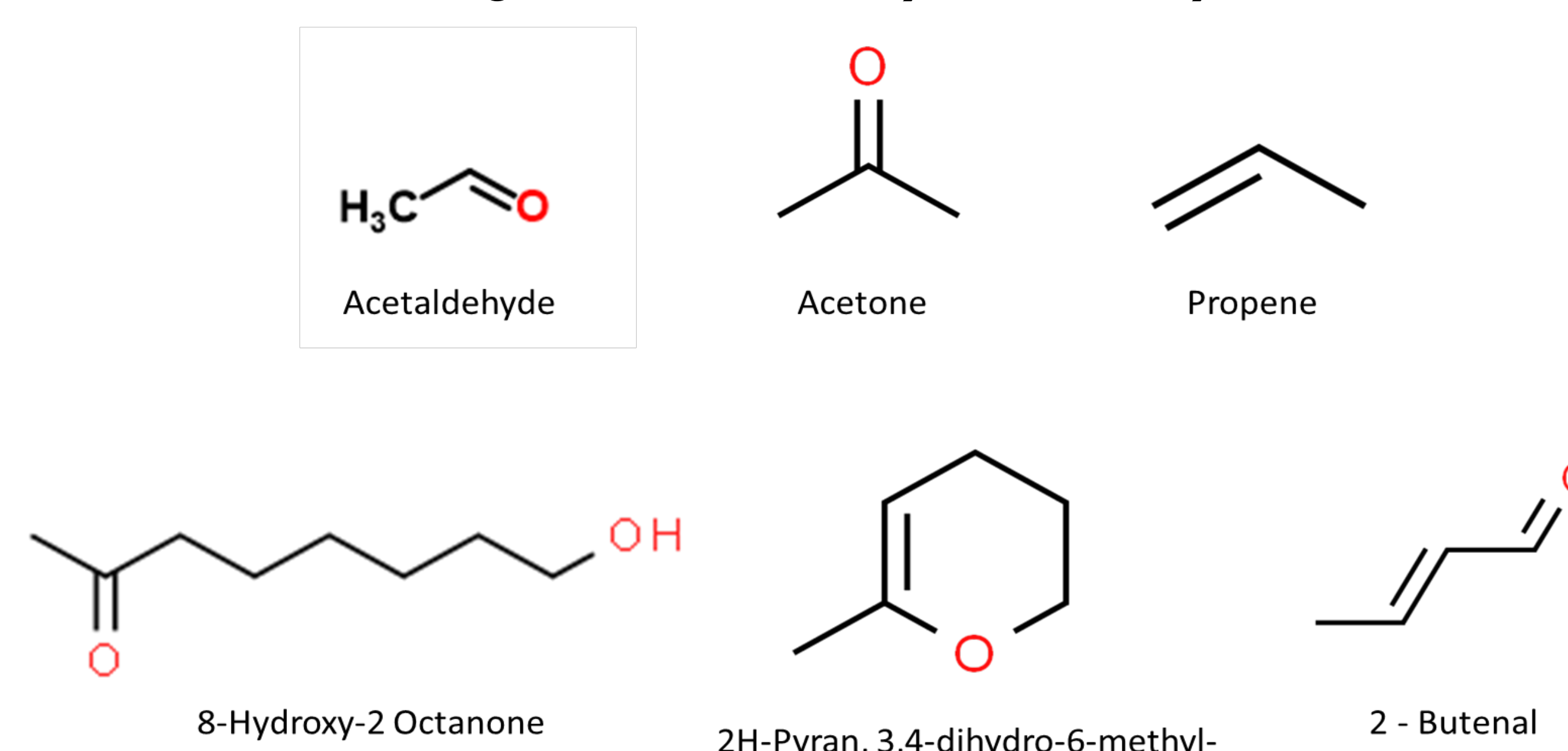


TGA & DTG curves of 27 mol% and 32 mol% EvOH



Part of the Surface chart of EvOH pyrolysis chromatogram

First dimension retention time (min)
GCxGC Chromatograms of EvOH: a) 32 mol% b) 27 mol%



Major compounds of EvOH pyrolysis

CONCLUSIONS

- The TGA curves of 27 mol% EvOH and 32 mol% EvOH show us that the degradation of both these grades is in a similar range. The average maximum thermal degradation temperatures from 397°C and 399°C for 27 mol% EvOH and 32 mol% EvOH respectively, as shown in the DTG curves.
- The two-dimensional gas chromatography gives us much more comprehensive information compared to the traditional one-dimensional gas chromatography, which can be seen in the surface chart.
- Although the barrier properties of 27 mol% EvOH are different from those of 32 mol% EvOH, they elute the same pyrolysis products with different yields.
- Acetaldehyde, acetone, propene, 8-Hydroxy-2-Octanone, 2H-Pyran, 3,4 - dihydro-6-methyl-, 2 Butenal are some of the major products of pyrolysis of EvOH.

REFERENCES

- OECD. (2022). Plastic pollution is growing relentlessly as waste management and recycling fall short, says OECD.
- Walker, T. W., Frelka, N., Shen, Z., Chew, A. K., Banick, J., Grey, S., Kim, M. S., Dumesic, J. A., Van Lehn, R. C., & Huber, G. W. (2020). Recycling of multilayer plastic packaging materials by solvent-targeted recovery and precipitation. *Science Advances*.
- Maes, C., Luyten, W., Herremans, G., Peeters, R., Carleer, R., & Buntinx, M. (2018). Recent Updates on the Barrier Properties of Ethylene Vinyl Alcohol Copolymer (EVOH): A Review. *Polymer Reviews*, 58(2), 209–246.
- Ozge Deniz Bozkurt, Sean Timothy Okonsky, Konstantinos Alexopoulos, Hilal Ezgi Toraman. (2022) Chapter Four - Catalytic conversion of SPW and products upgrading. *Towards Circular Economy: Closing the Loop with Chemical Recycling of Solid Plastic Waste*.
- Barbara Alejandra Perez, J.V. Jayarama Krishna, & Hilal Ezgi Toraman. (2023). Insights into co-pyrolysis of polyethylene terephthalate and polyamide 6 mixture through experiments, kinetic modeling and machine learning. *Chemical Engineering Journal*, 468, 143637–143637.

ACKNOWLEDGEMENTS

