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Re-using food packaging and ocean waste plastic as additive modifier in asphalt materials

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1 Problem discussion



- Since 2016, the amount of plastic sent to recycling across Europe has more than doubled (Plastics Europe, 2022)
- The EU aims to be climate-neutral by 2050 – an economy with net-zero greenhouse gas emissions (European Green Deal)
- Italy is the second largest consumer of plastics in Europe. The main sector (42%) in which plastics are used is packaging (ECCO, 2020)

Research problem: the increase of waste plastic resources without proper destination

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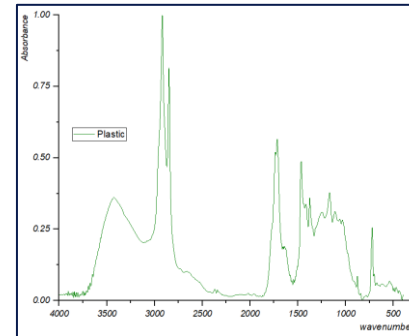
Problem discussion



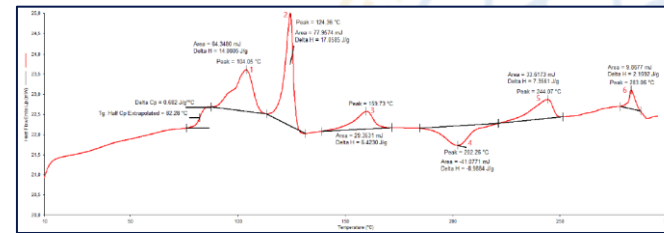
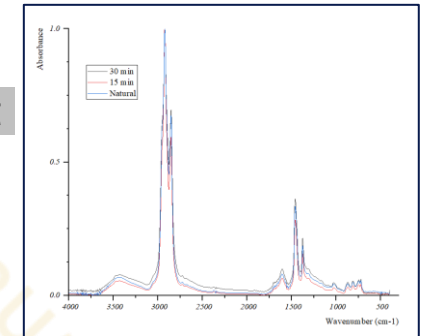
OBJECTIVE: to propose and analyze methods for inserting waste plastic in asphalt mixes



2 Preliminary tests and analysis

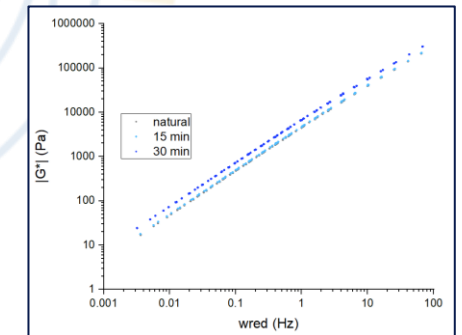


FTIR spectroscopy: gives an indication of what kind of chemical bonds there are inside the material



TG/DSC: guide the comprehension of the reaction of the materials to the heating process

Frequency Sweep: with rheology-based analysis is possible to better understand the mechanical behavior of the material when submitted to stress. Some parameters, such as stiffness are fundamental for asphalt modeling.



3 Future research goals

- ❑ To describe the behavior of the waste plastic when in contact with the bitumen
- ❑ To find and optimize the ideal content of waste plastic in asphalt mixes to guarantee high performance
- ❑ To propose a method for analyzing binders of mixes that have waste plastics in its composition

