

Direct Polypropylene and Polyethylene Liquefaction in CO₂ and N₂ Atmospheres Using MgO Light and CaO as Catalysts

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As supplementary information, simulated distillation (SIMDIS), TGA, ATR and mass balance analysis results are exposed in Figures S1–S8 for an additional test carried out for a polypropylene (PP) waste (a mixture of polypropylene waste from cars recycling). These results are included here because it was not the main purpose of the original manuscript but we consider this information really useful for researchers and people interested in this type of reactions applied for real plastics. In addition, some more analyses would be needed such as the halogenes analysis, metals analysis (high ash content according to TGA results).

Complete patterns of SIMDIS were included (for all the tests results) in Figures S1 and S2.

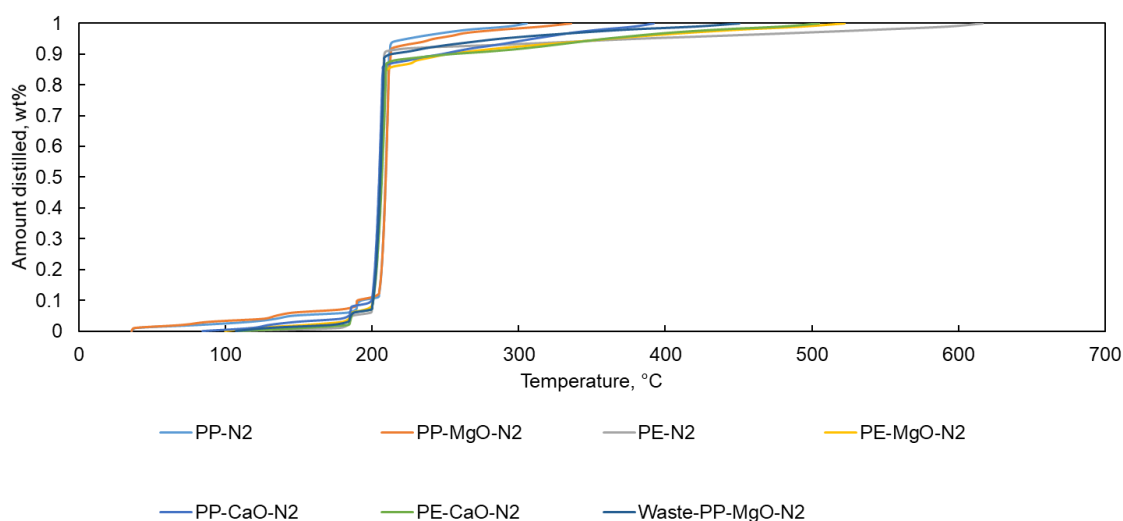


Figure S1. SIMDIS pattern of all the products from the tests carried out in N₂.

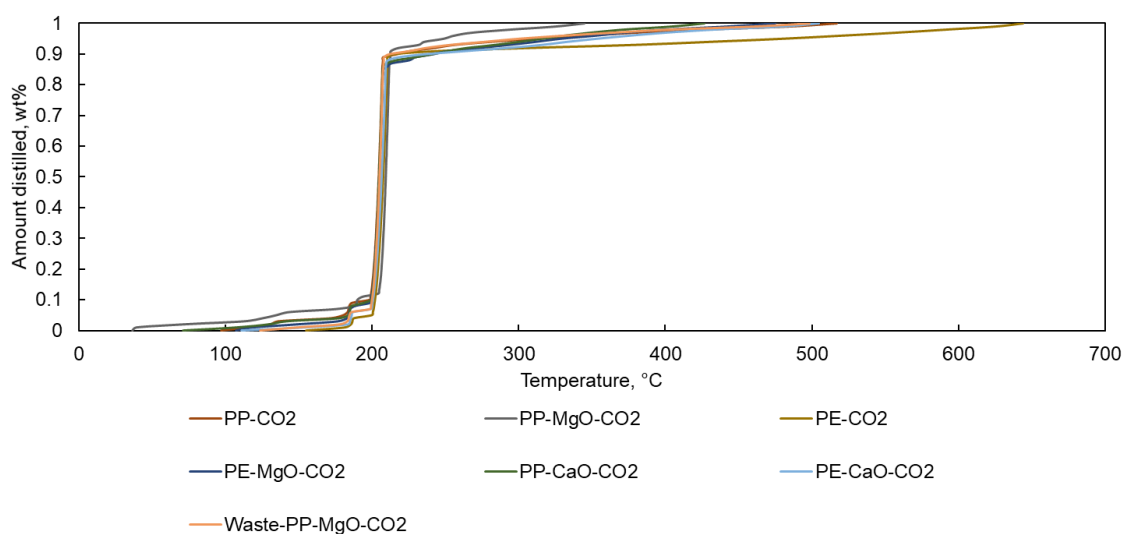


Figure S2. SIMDIS pattern of all the products from the tests carried out in CO₂.

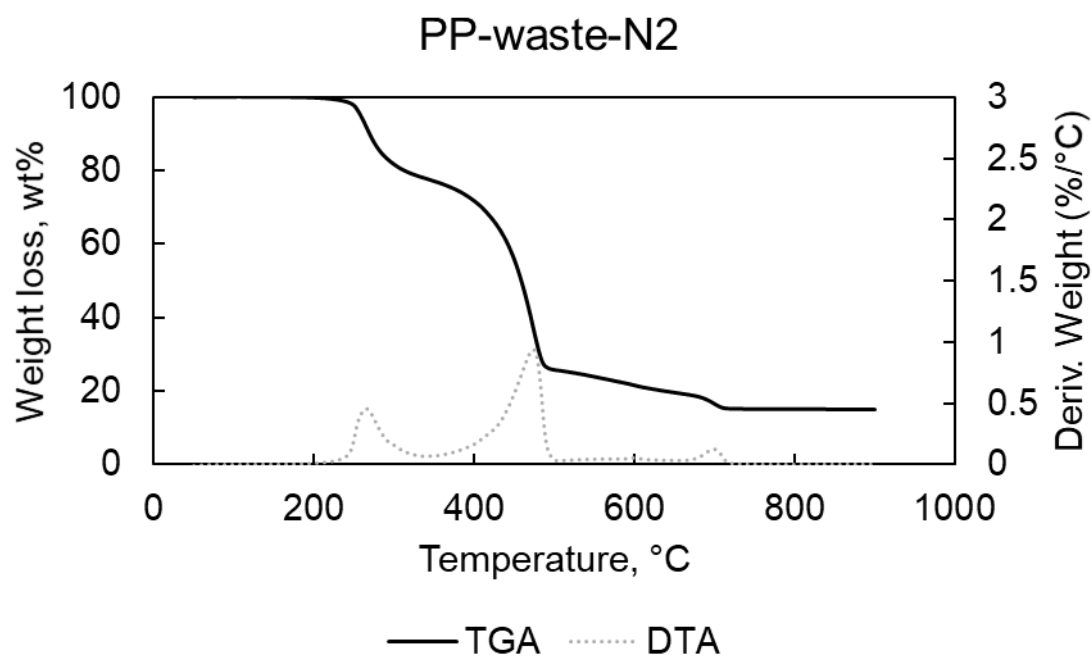


Figure S3. TGA analyses in N₂.

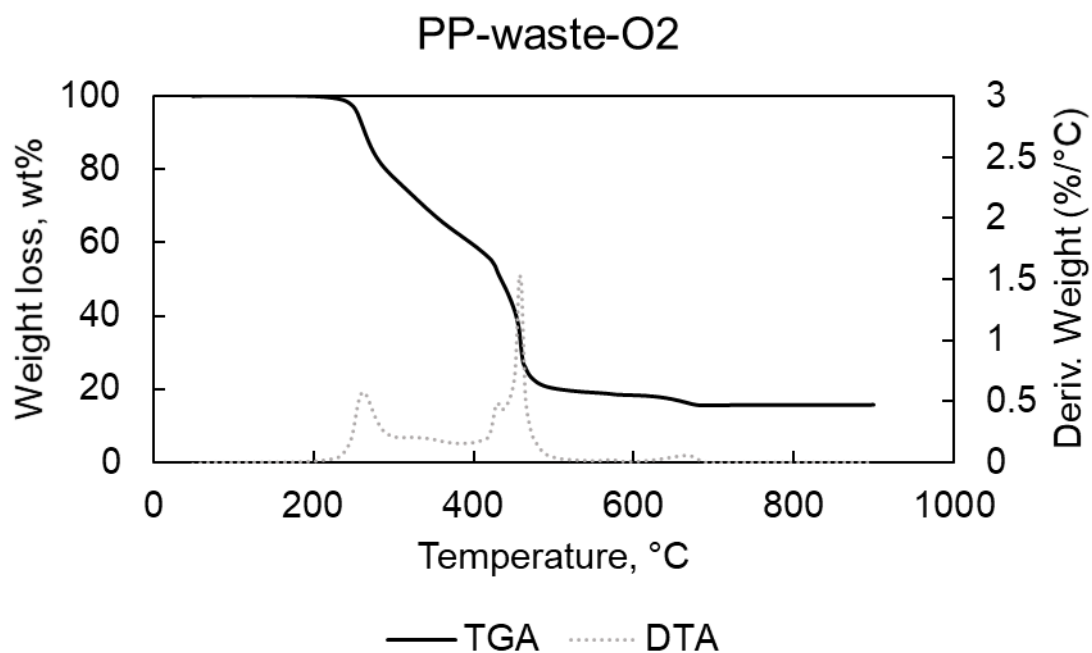


Figure S4. TGA analyses in O₂.

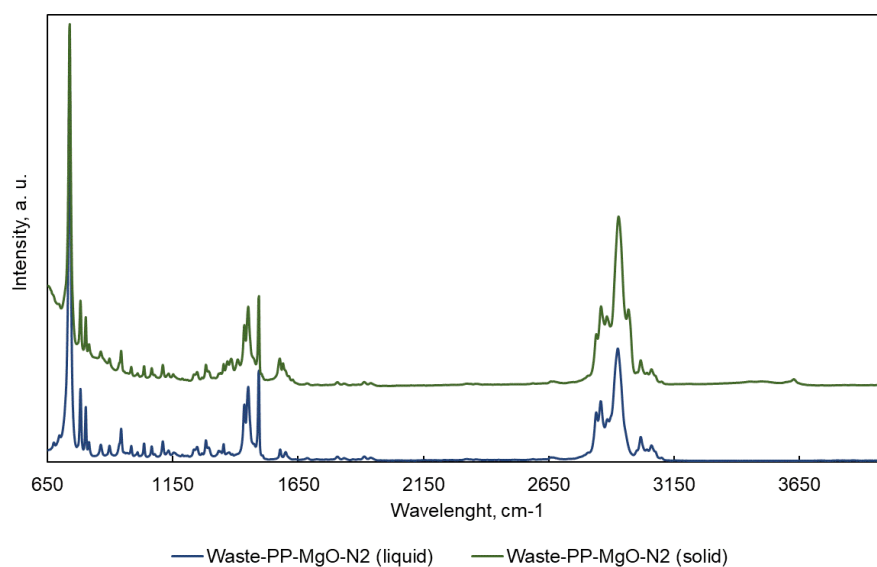


Figure S5. ATR-FTIR for liquid and solid products using waste propylene plastic in N₂ atmosphere.

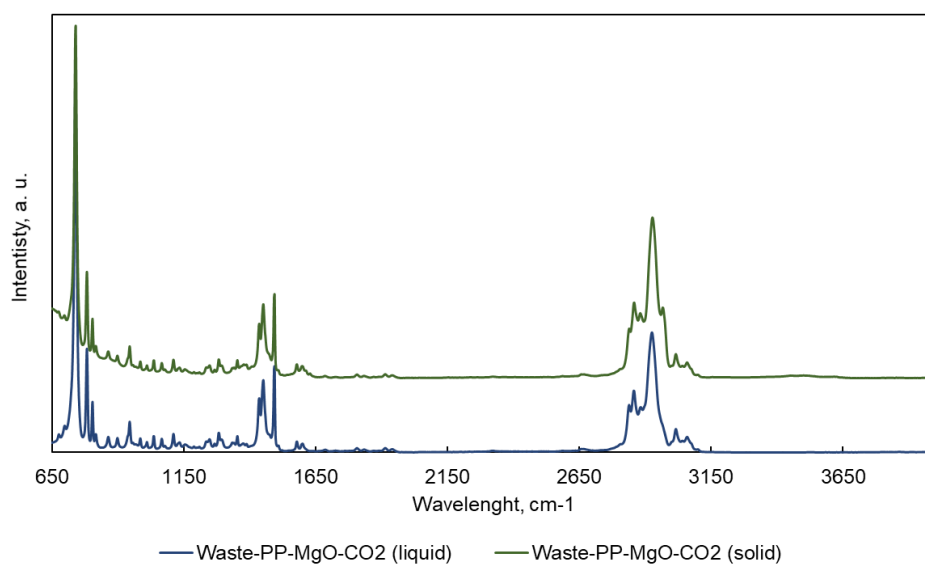


Figure S6. ATR-FTIR for liquid and solid products using waste propylene plastic in CO₂ atmosphere.

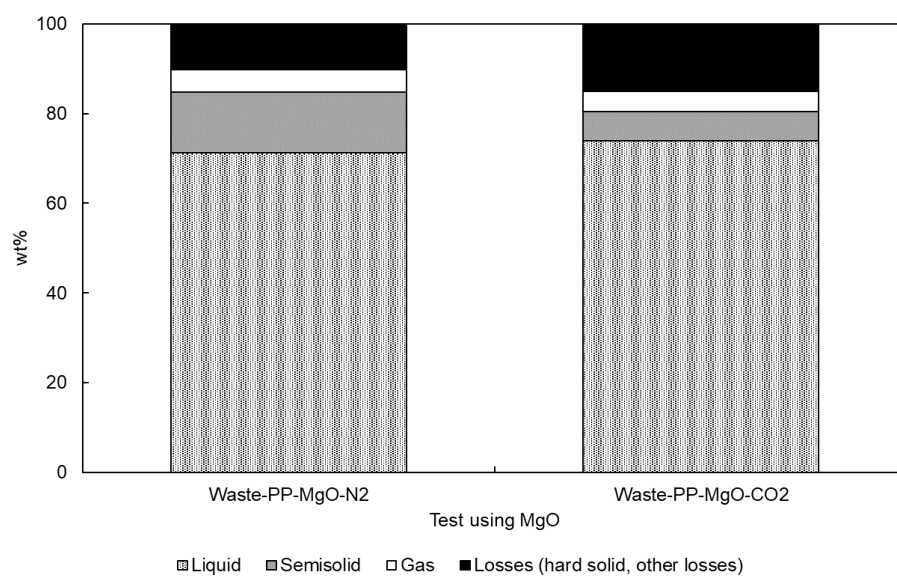


Figure S7. Mass balance for the obtained products using the waste plastic under N₂ or CO₂.

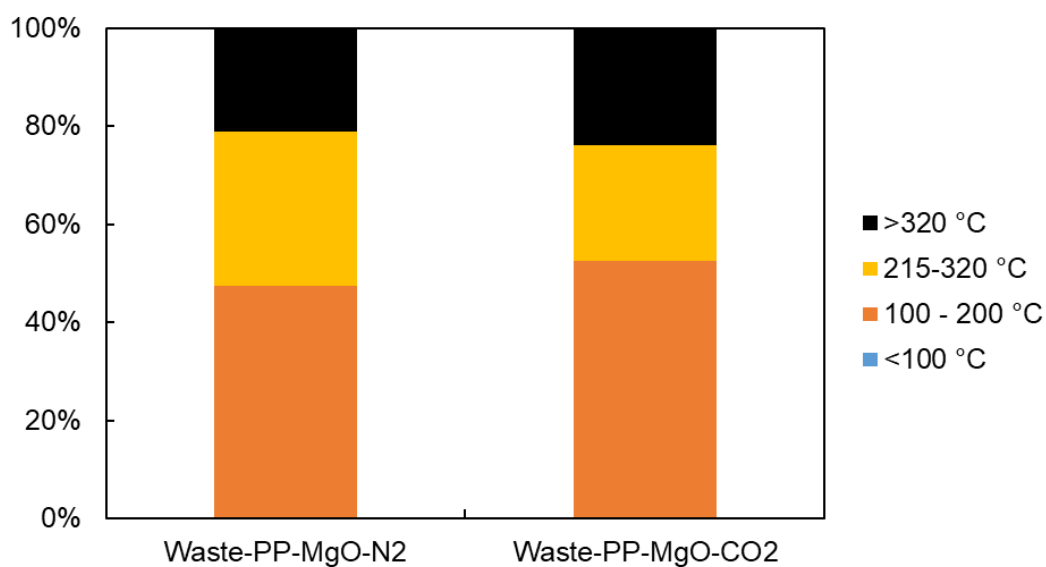


Figure S8. SIMDIS for the liquid products from the waste propylene plastic obtained under N₂ or CO₂.

Table S1. Results from the analysis of physisorption (Samples were degassed in Autosorb iQ at 110 °C for 24.3 h.

Parameter	MgO Light	CaO
Isotherm type	IV	IV
Hysteresis	H3	H3
Total pore volume [cm ³ / g]	0.236	0.054
BET specific surface area [m ² / g]	36.1	10.0
Range p / p ₀ for SBET	0.10–0.25	0.15–0.30
Number of points	4	4
Constant C	90	23
Correlation coefficient, r	0.999991	0.999982
V-t analysis		
Micropore volume [cm ³ / g]	0.000	0.000
Outer surface [m ² / g]	36.1	10.0
NLDFT analysis		
Specific surface area [m ² / g]	40.3	8.2
Total pore volume [cm ³ / g]	0.189	0.027
Micropore volume [cm ³ / g]	0.000	0.000
Mesopore volume [cm ³ / g]	0.166	0.019
NLDFT model match [%]	97.44	98.01
NLDFT model	2	2
BJH analysis		
Specific surface area [m ² / g]	41.4	7.4
Total pore volume [cm ³ / g]	0.237	0.053
Mesopore volume [cm ³ / g]	0.188	0.019