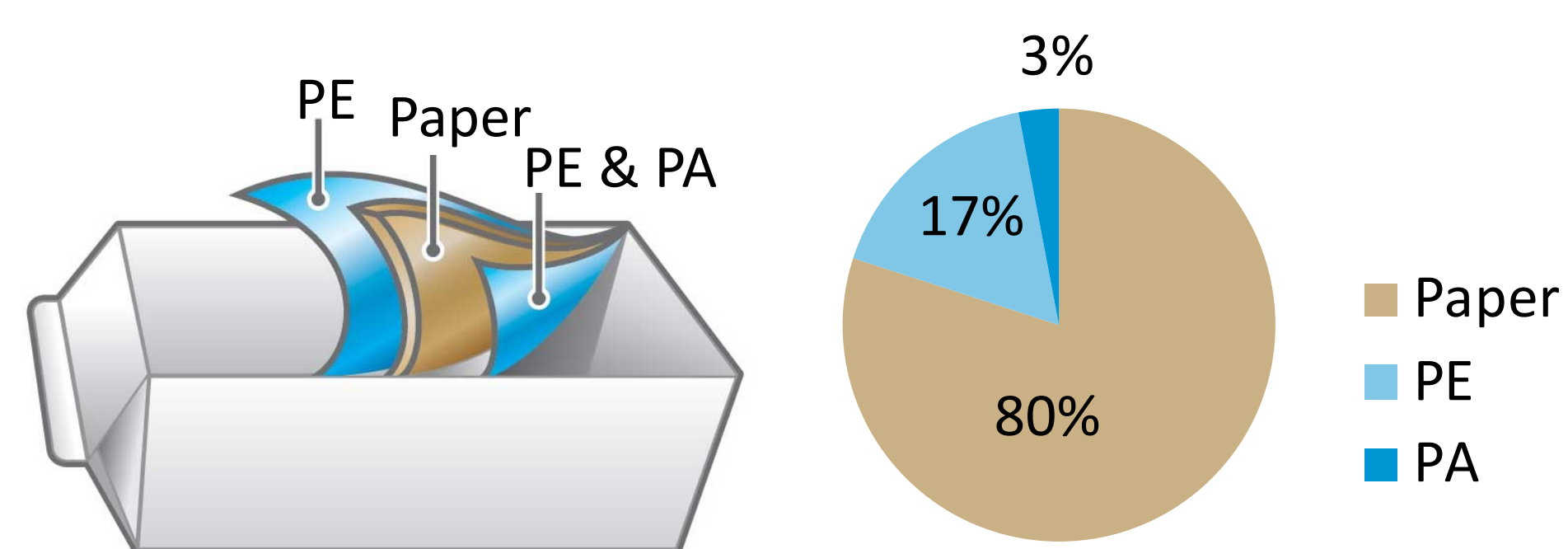
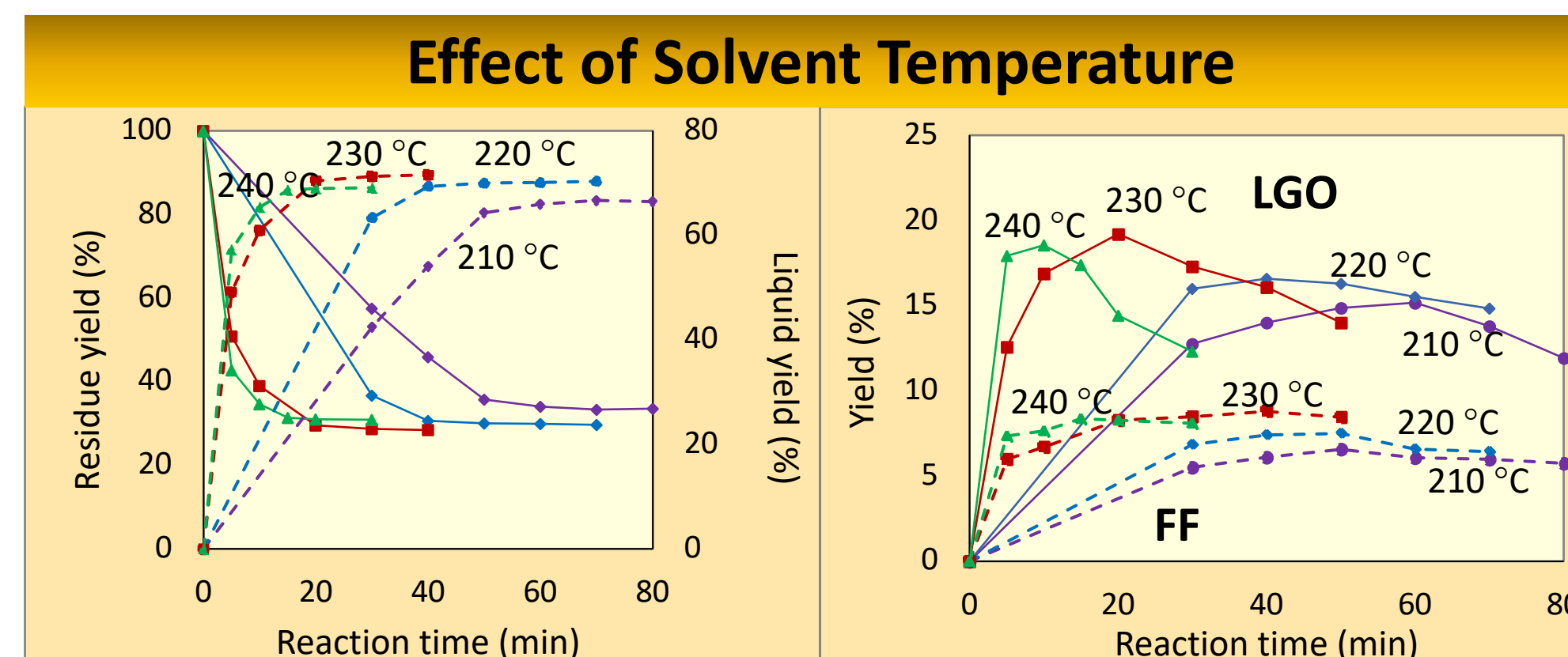
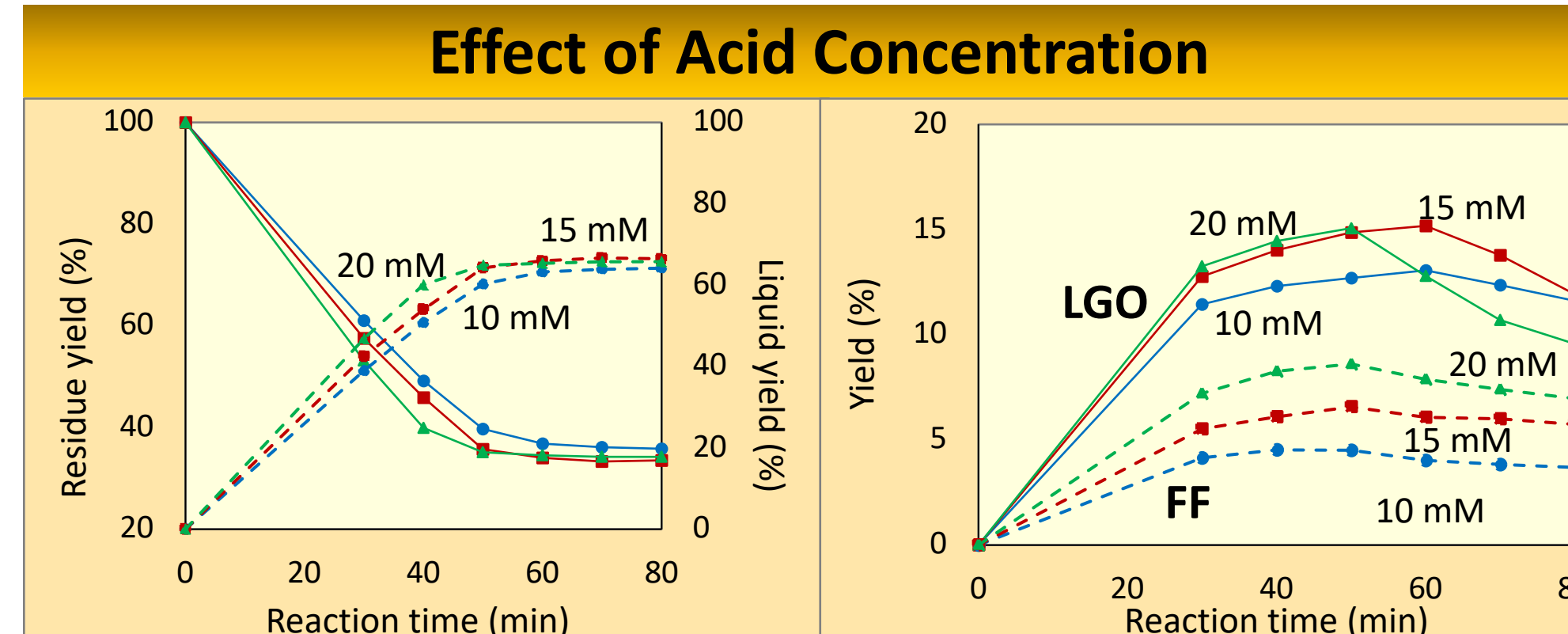


1. Introduction

- Billion tons of carton packages are discarded annually as land wastes and ocean wastes.
- Carton recycling is hindered by the multi-material composition.
- Carton is a laminated composite with multiple layers of paper, polymers such as polyethylene (PE) and polyamide (PA), and/or aluminum.
- Current carton recycling technologies, such as hydro-pulping and pyrolysis, are energy-intensive with low-value recycled products.
- In this study, each component of carton was selectively recycled into value-added products.

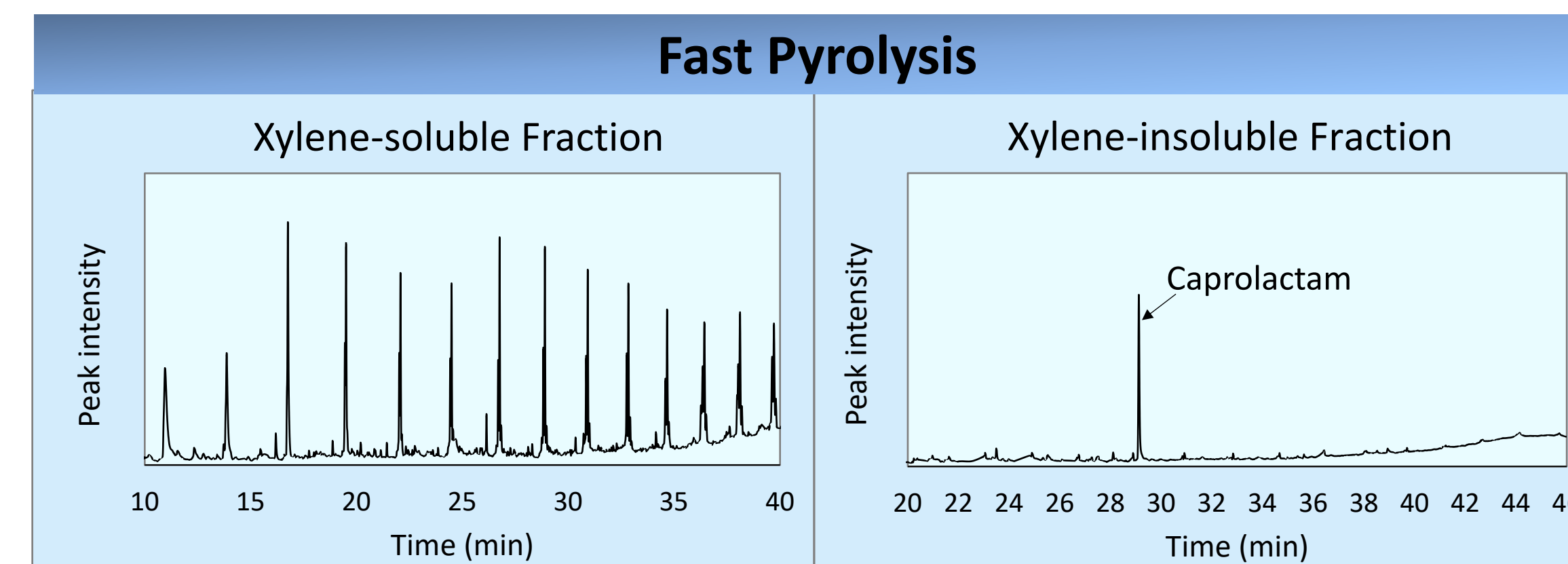
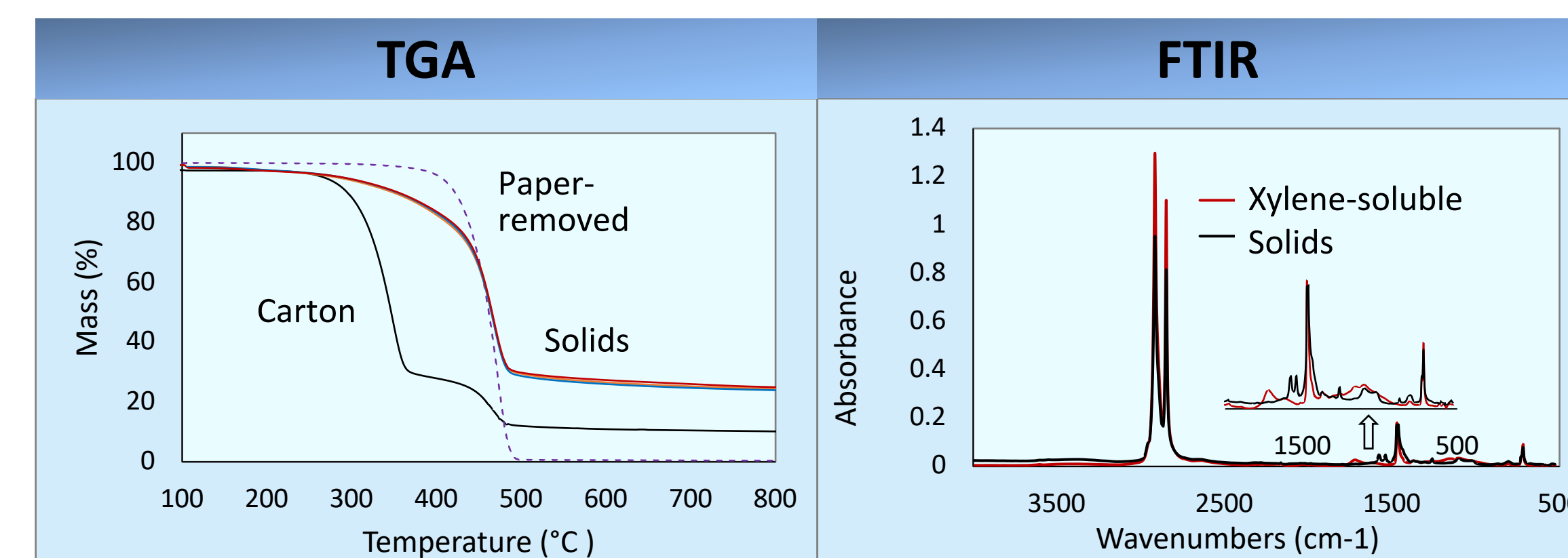


3. Selective Conversion of Paper Fraction



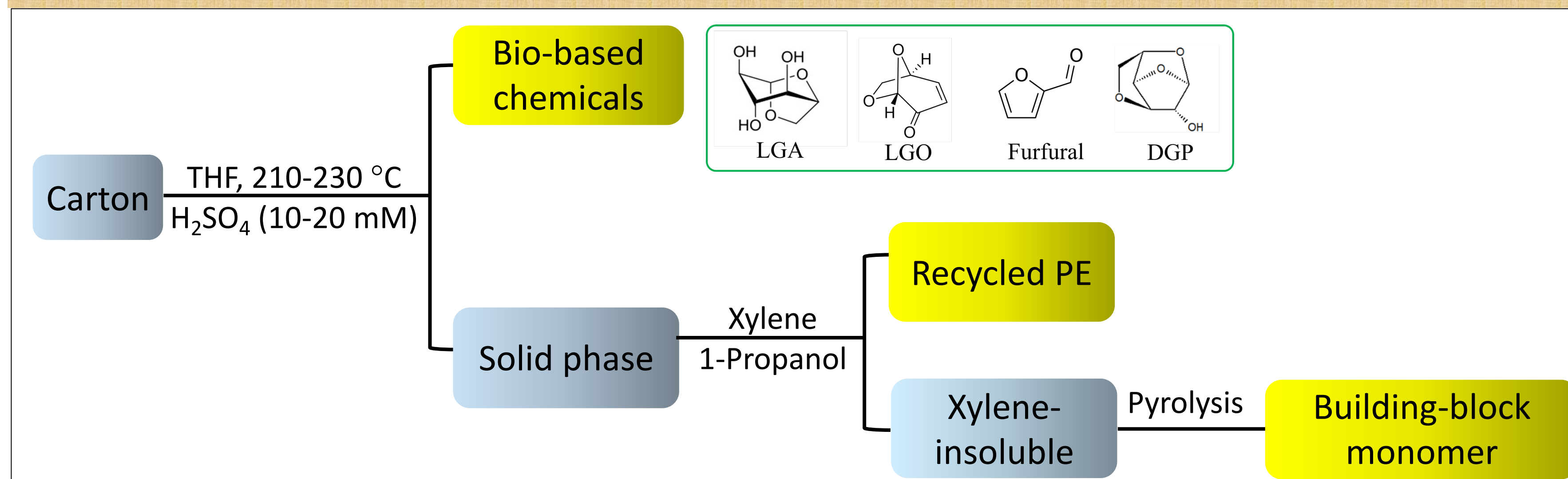
- ✓ Paper was selectively converted to biochemicals.
- ✓ Over 70% of carton was converted to liquid products.
- ✓ Up to 19.2% of LGO was obtained at 230 °C, 15mM.

4. Upcycling Solids Containing PE and PA



- ✓ PE was selectively dissolved in xylene.
- ✓ PA was selectively converted to caprolactam using pyrolysis.
- ✓ Paper-derived char could be a high-quality solid fuel.

2. Proposed Recycling Strategy



5. Conclusions

