

SYNTHESIS OF AN AROMATIC BIOBASED MONOMER FROM 4-VINYL GUAIACOL AND ITS PISA-RAFT EMULSION POLYMERIZATION

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In recent years, the depletion of fossil fuels, fluctuating petrol prices, global environmental concerns, and stringent regulations have encouraged the development of new biobased monomers and polymers.¹ To contribute to this shift, we have used 4-vinyl guaiacol (4VG), a lignin-derived phenolic compound obtained by decarboxylation of ferulic acid, to synthesize 2-methoxy-4-vinylphenyl acetate (Ac4VG) as a biobased monomer.² The synthesis processes were evaluated using green metrics calculations to assess their sustainability. Poly(Ac4VG) homopolymer was prepared by radical aqueous emulsion polymerization, resulting in a stable latex that was characterized for its thermal, chemical and physical properties and compared with polystyrene. The degradation reaction (hydrolysis) which can occur on Ac4VG monomer or polymer producing 4VG phenolic compound that acts as radical scavenger was investigated. Using RAFT-PISA strategy and poly(ethylene oxide) methyl ether acrylate (APEO) as comonomer, the synthesis of poly(APEO)-*b*-poly(Ac4VG) block copolymer was achieved. We demonstrated that by varying the DP_{Ac4VG} between 50 and 200, latexes of different morphologies were formed as observed by TEM. As a result, this sustainable biobased monomer presents interesting properties that makes it suitable for various applications aimed at minimizing the environmental impact of the polymer industry.

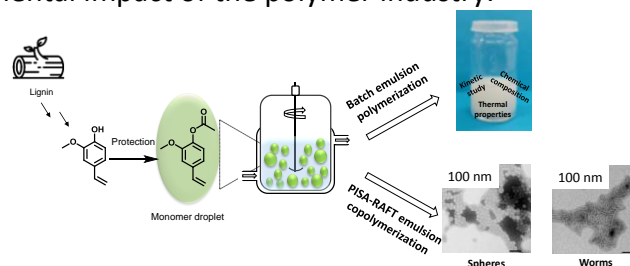


Figure 1: Production of biobased latexes by radical aqueous emulsion (co)polymerization of 2-methoxy-4-vinylphenyl acetate.

Références :

1. Halttunen, K.; Slade, R.; Staffell, I. What If We Never Run out of Oil? From Certainty of "Peak Oil" to "Peak Demand." *Energy Res. Soc. Sci.* **2022**, *85*, 102407, doi:10.1016/j.erss.2021.102407.
2. Rigo, E.; Totée, C.; Ladmiral, V.; Caillol, S.; Lacroix-Desmazes, P. 4-Vinyl Guaiacol: A Key Intermediate for Biobased Polymers. *Molecules* **2024**, *29*, 2507, doi:10.3390/molecules29112507.