CO2-Binding Alcohols as Potential Candidates for Poly(Vinyl Chloride) Upcycling

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Supplementary Figures

1. <u>TBD-based CO₂-binding Organic Alcohols (CO₂BALs)</u>

1.1. Methylcarbonate, TBD.H⁺



Supplementary Figure S1. ¹H NMR spectrum (60 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between methanol and TBD under CO₂ bubbling.



Supplementary Figure S2. Thermogravimetric analysis (TGA) of the product of the reaction between methanol and TBD under CO_2 bubbling.

1.2. Ethylcarbonate, TBD.H⁺



Supplementary Figure S3. ¹H NMR spectrum (60 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between ethanol and TBD under CO₂ bubbling.



Supplementary Figure S4. TGA of the product of the reaction between ethanol and TBD under CO₂ bubbling.

1.3. <u>1-Propylcarbonate, TBD.H+</u>



Supplementary Figure S5. ¹H NMR spectrum (60 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between 1-propanol and TBD under CO₂ bubbling.



Supplementary Figure S6. TGA of the product of the reaction between 1-propanol and TBD under CO₂ bubbling.

1.4. <u>1-Butylcarbonate, TBD.H+</u>



Supplementary Figure S7. ¹H NMR spectrum (500 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between 1-butanol and TBD under CO₂ bubbling.



Supplementary Figure S8. TGA of the product of the reaction between 1-butanol and TBD under CO_2 bubbling.

1.5. 1-Hexylcarbonate, TBD.H⁺



Supplementary Figure S9. ¹H NMR spectrum (500 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between 1-hexanol and TBD under CO₂ bubbling.



Supplementary Figure S10. TGA of the product of the reaction between 1-hexanol and TBD under CO_2 bubbling.

1.6. 1-Octylcarbonate, TBD.H⁺



Supplementary Figure S11. ¹H NMR spectrum (500 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between 1-octanol and TBD under CO₂ bubbling.



Supplementary Figure S12. TGA of the product of the reaction between 1-octanol and TBD under CO₂ bubbling.

1.7. <u>1-Decylcarbonate, TBD.H+</u>



Supplementary Figure S13. ¹H NMR spectrum (500 MHz, CDCl₃, zoomed between $\delta = 0$ ppm and $\delta = 4.5$ ppm) of the product of the reaction between 1-decanol and TBD under CO₂ bubbling : a) 50 %, b) 75 %, and c) 80 % conversion, respectively.



Supplementary Figure S14. TGA of the product of the reaction between 1-decanol and TBD under CO₂ bubbling.

2. Product of reactions between PVC and 1-decylcarbonate, TBD.H⁺



Supplementary Figure S15. ¹H NMR spectrum (500 MHz, THF-*d8*, zoomed between $\delta = 0$ ppm and $\delta = 6.75$ ppm) of pristine PVC.



Supplementary Figure S16. ¹H NMR spectrum (500 MHz, THF-*d8*, zoomed between $\delta = 4.0$ ppm and $\delta = 6.75$ ppm) of the product of the reaction between 1-decylcarbonate, TBD.H⁺ (CO₂BAL conv. = a) 0%, b) 50%, c) 75%, and d) 80%) and PVC in MEK for 1 hour.



Supplementary Figure S17. SEC traces of pristine PVC (dark blue) and the product of the reaction between 1-decylcarbonate, TBD.H⁺ and PVC in DMF for 30 minutes (orange), 1 hour (dark green), 2 hours (light blue), 18 hours (purple), and 72 hours (light green).



Supplementary Figure S18. Effect of reaction time on the polymer's relative M_n determined by SEC.