

Supporting Information

Supercritical Removal Method: Rapid Elimination of Impurities in Polymethyl-methacrylate at Near Room Temperature and Mechanism Investigation of Insulating Property Improvement

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Carbon oxide (CO₂) is the best suitable and environmentally-friendly supercritical solvent and it enters supercritical state under the minimum critical pressure 1072 psi and minimum temperature 31 °C. The operating pressure was set at 1500 psi, a bit higher than the critical pressure (1072 psi) in order to guarantee the CO₂ in supercritical phase and simultaneously achieve the impurity elimination at most accessible and energy-saving condition. For better illustrating the influence of pressure, temperature and time, several contrast experiments were carried out.

When applied higher pressure or higher temperature, the structure will foam or swell in certain degree. Comparing these experiment conditions, we find that the best suitable experimental parameters are 1500 psi, 40 °C and 15 min in Table S1.

Table S1. Phenomena under different supercritical treatment conditions

Conditions	Pressure (psi)	Temperature (°C)	Time (min)	Phenomena
1	1500	40	15	Leakage reduced by 11.3 times
2	2000	40	15	Foaming
3	1500	80	15	Foaming and Swelling
4	1500	60	15	Leakage reduced by 4.7 times
5	1500	40	30	Leakage reduced by 10.8 times