

ESI for

Probing the effect of straight chain fatty acids on the properties of lead-containing plexiglass

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FTIR spectra of the products

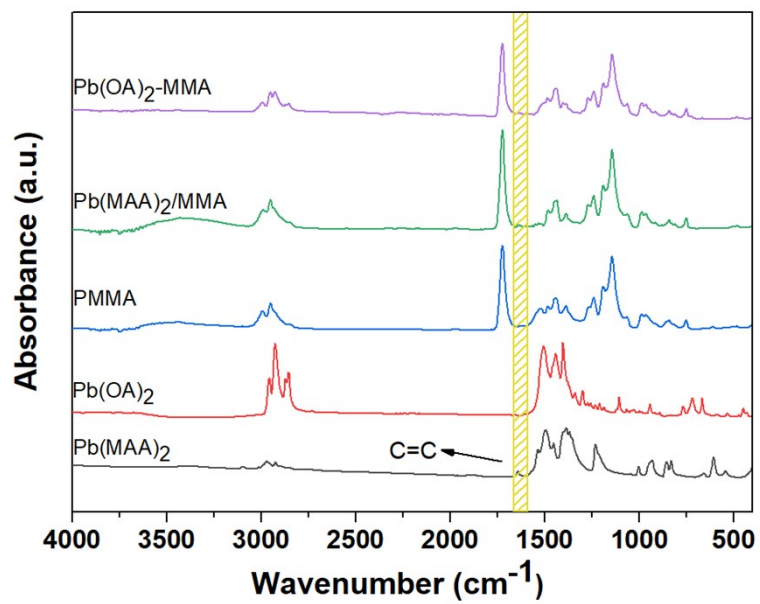


Fig. S1 FTIR Spectra of the Products

The free volume size of the products

Table S1 PALS Data of the products¹

Entry	Sample	τ_3^a	R_3^a	V_f^a
1	20%Pb(MAA) ₂ /MMA-4phrOA	2.04	2.89	101.04
2	20%Pb(MAA) ₂ /MMA-16phrOA	2.28	3.09	123.67

^a The unit of τ_3 (i.e. the third lifetime component), R_3 (i.e. the radius of the free volume cavity) and V_f (i.e. the volume of free volume cavity) were ns, Å and Å³ respectively.

$$\tau_3 = \frac{1}{2} \left[1 - \frac{R}{R + \Delta R} + \frac{1}{2\pi} \sin \left(\frac{2\pi R}{R + \Delta R} \right) \right]^{-1}$$

$$V_f = \frac{4}{3} \pi R^3$$

$$\Delta R = 1.656 \text{ \AA}$$

References

1. (a) K. Kato, A. Ohara, K. Michishio and K. Ito, *Macromolecules*, 2020, **53**, 8910; (b) S. K. Sharma and P. K. Pujari, *Prog. Polym. Sci.*, 2017, **75**, 31.

Optical properties of the products

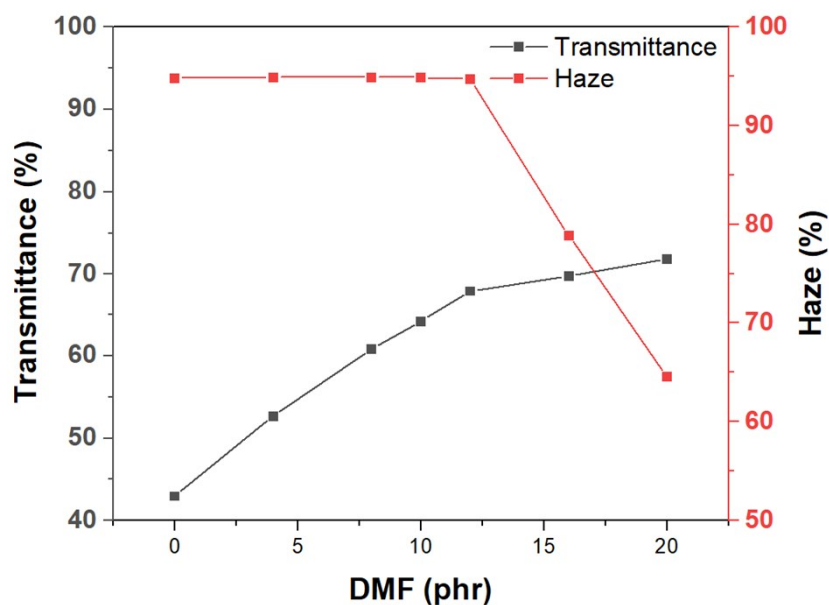


Fig. S2 The effect of the content of DMF on the optical properties of $\text{Pb}(\text{MAA})_2$ -containing plexiglasses, in which the mass ratio of $\text{Pb}(\text{MAA})_2$ and MMA was 20:80.

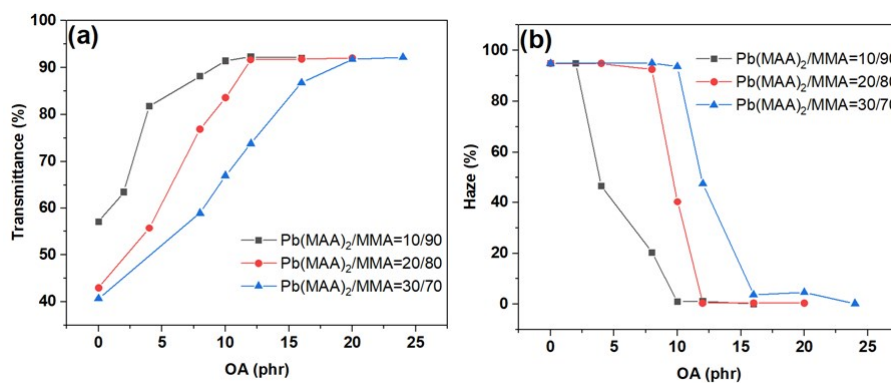


Fig. S3 The content of OA on the optical properties of $\text{Pb}(\text{MAA})_2$ -containing plexiglasses with different ratios of $\text{Pb}(\text{MAA})_2$ and MMA. (a) The light transmittance; (b) the haze.

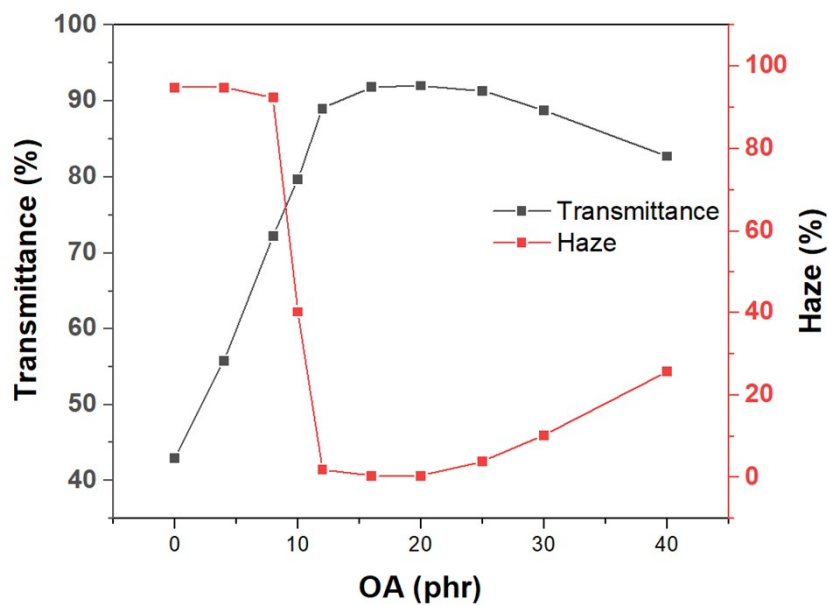


Fig. S4 The effect of the content of OA on the optical properties of Pb(MAA)₂-containing plexiglasses, in which the mass ratio of Pb(MAA)₂ and MMA was 20:80.

XRD patterns of the Products

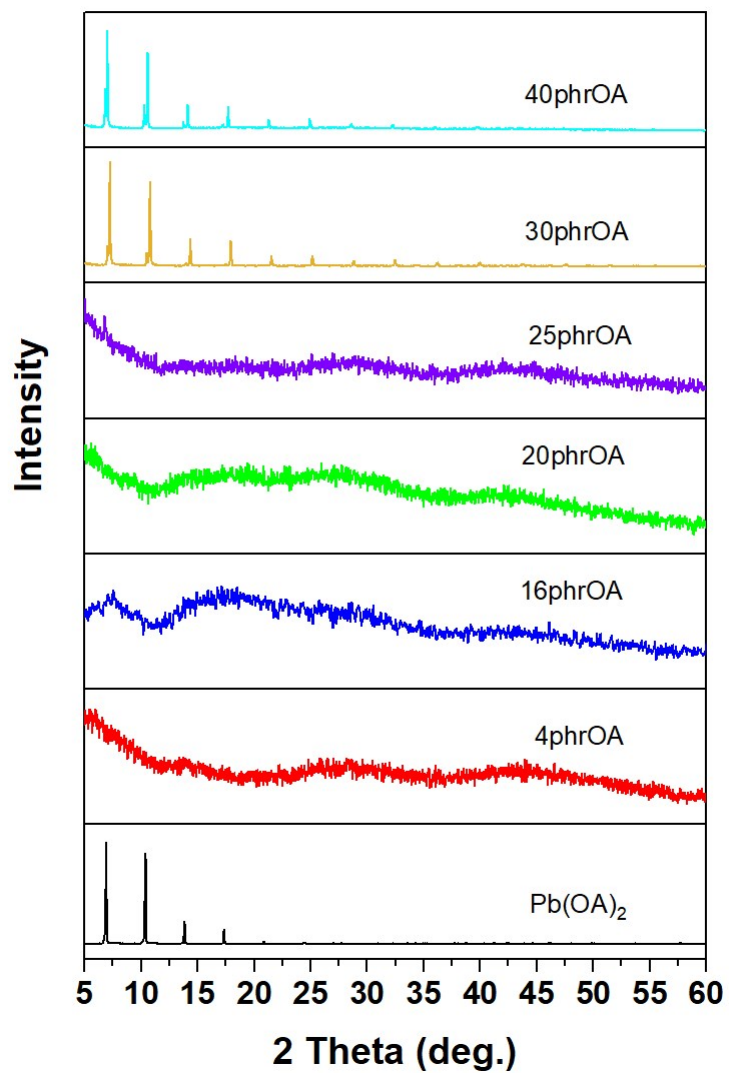


Fig. S5 XRD patterns of the Products

γ -ray shielding performance of the products

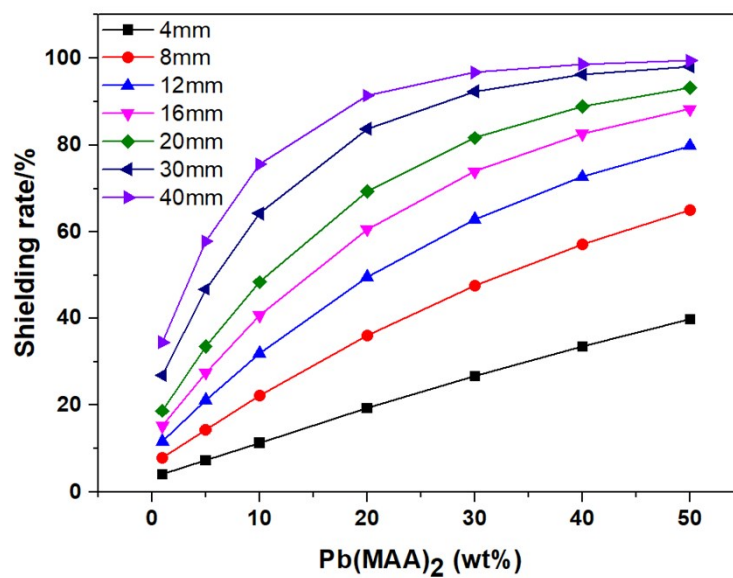


Fig. S6 The shielding rate of lead-containing plexiglasses against photons with the energy of 100keV.