An Easy Fabrication Method to Prepare Inexpensive UV–Cured Transparent Silicone Modified Polyacrylate Coatings with Good Adhesion and UV Resistance

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1. SEC analysis of the copolymers

![Figure S1. SEC curves of the copolymer with various of styrene content.](image-url)

The SEC curves of the copolymer with various of styrene content were shown in Figure S1. The molecular weight of the copolymers were following: 0, $2.65 \times 10^4$; 6.0 wt.%, $2.85 \times 10^4$; 12.0 wt.%, $3.10 \times 10^4$; 18.0 wt.%, $3.25 \times 10^4$; 24.0 wt.%, $3.80 \times 10^4$. 
2. FT–IR analysis of the copolymers

FT–IR analysis of the copolymers was carried out as shown in Figure S2. It can be seen that the absorption at 3500 cm\(^{-1}\) is characteristic peak of the association of carboxyl group from acrylic acid with hydroxypropyl from hydroxypropyl methacrylate. The absorption at 1730 cm\(^{-1}\) can be ascribed to be characteristic peak of carbonyl group in copolymer and the weak absorption at 1621 cm\(^{-1}\) can be ascribed to be characteristic peaks of terminal acrylate group in the copolymer. The absorptions at 3030–2845 cm\(^{-1}\) and 1942–1801 cm\(^{-1}\) are ascribed to be characteristic peaks of unsaturated hydrocarbon bond and stretching vibration peaks of C=H in benzene ring from styrene respectively.

![FT–IR spectrum for copolymers prepared of acrylate monomers and styrene.](image)
3. $^1$H–NMR analysis of the copolymers

$^1$H–NMR analysis was performed to determine the chemical structure of the copolymers (Figure S3) and the chemical shifts are ascribed as following:

$^1$H–NMR (400MHz, CDCl$_3$): $\delta$ (ppm) 6.8–7.3 (3H, –C$_6$H$_5$ of styrene), 0.8–1.0 (3H, –CH$_3$), 3.3–3.8(3H, –OCH$_3$ of acrylate derivatives), 1.4–1.7 (2H, –CH$_2$– of acrylate derivatives).

Figure S3. $^1$H–NMR spectrum for copolymers prepared of acrylate monomers and styrene.
4. The scheme for preparation of copolymers of acrylates and styrene

\[
\text{H}_2\text{C}=\text{CH} + \text{H}_2\text{C}=\text{C}-\text{COOC}_2\text{H}_5 + \text{H}_2\text{C}=\text{CH}-\text{COOC}_4\text{H}_9 + \text{H}_2\text{C}=\text{CHCOOH} + \text{H}_2\text{C}=\text{CHCOOCH}_2\text{CH}_2\text{CH}_2\text{OH} \rightarrow \text{AIBN} \quad 80^\circ \text{C}
\]

Scheme S1. The scheme for preparation of copolymers of acrylates and styrene.

5. The scheme for preparation of transparent materials by UV curing method

\[
\text{H}_2\text{C} = \text{C} - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{CH}_2 - \text{COOH} + \text{H}_2\text{C} = \text{CHCOOCH}_2\text{CH}_2\text{CH}_2\text{OH} \rightarrow \text{UV}
\]

Scheme S2. The scheme for Preparation of transparent materials by UV curing method.

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