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아크릴 실란 가교제를 사용한 도로 표시용 실온 경화 아크릴 바인더의 특성

Characteristics of room temperature curing acrylate binders for road markings using acrylic silane crosslinkers

*Jae-Ryong Lee, Won-Bin Lim, Jin-Gyu Min, Ju-Hong Lee, Keun-Ho Lee, Ha Song Bong, Sang Wook Byun, Ji-Hong Bae, and Pil Ho Huh**

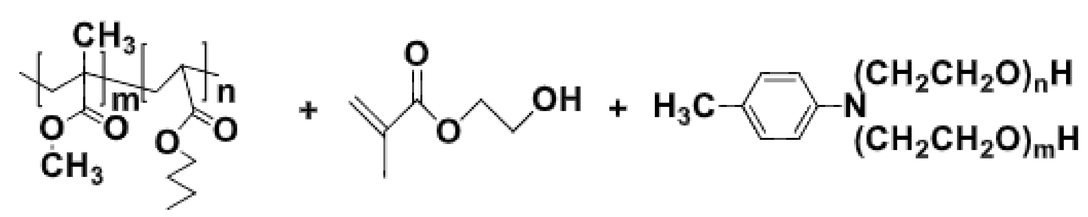
Department of Polymer Science and Engineering, Pusan National University, Busan 46241, South Korea

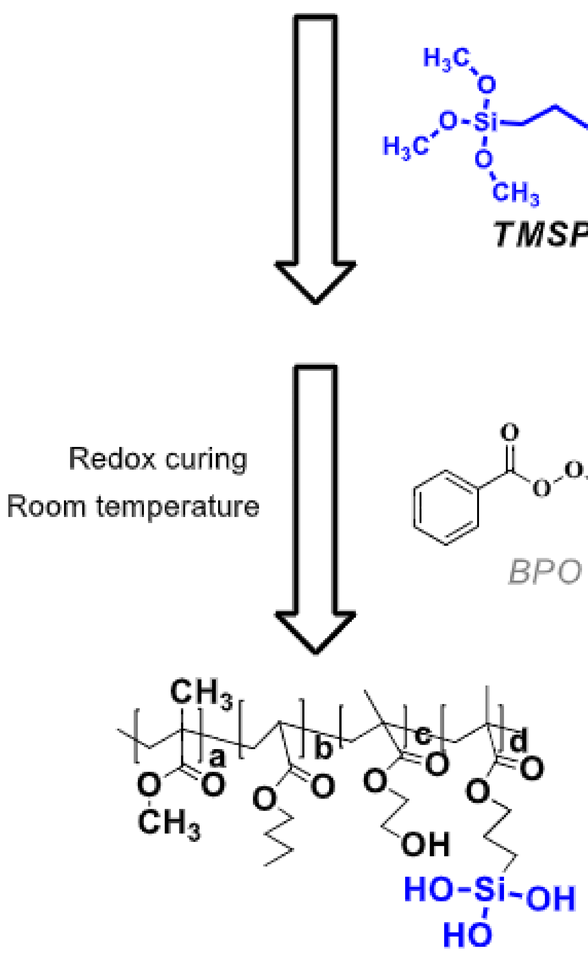
pilho.huh@pusan.ac.kr

Abstract

부틸아크릴레이트(BA), 메틸메타크릴레이트(MMA), 2-하이드록시에틸메타크릴레이트(2-HEMA), 3-(트리메톡시실릴)프로필메타크릴레이트(TMSPMA) 및 첨가제를 사용하여 복합구조 도료 마킹용 고성능 아크릴 수지를 합성하였다. 제조된 수지는 산화환원개시제 시스템(ROIS)을 사용하여 실온에서 경화시켰다. TMSPMA 함량 변화를 비교한 결과, 함량이 증가함에 따라 수지의 주쇄 구조 내 가교 네트워크가 최적화되어 접착력과 투과성이 모두 향상되는 것으로 나타났다. 이러한 아크릴 수지의 기계적 및 형태적 특성은 만능 시험기(UTM), UV 분광법, 주사전자현미경(SEM)을 사용하여 종합적으로 평가하였다.

Experimenztal





Experimental

Step 1 Blend Acrylic monomer and catalyst

Step 2 Add initiator and Stir

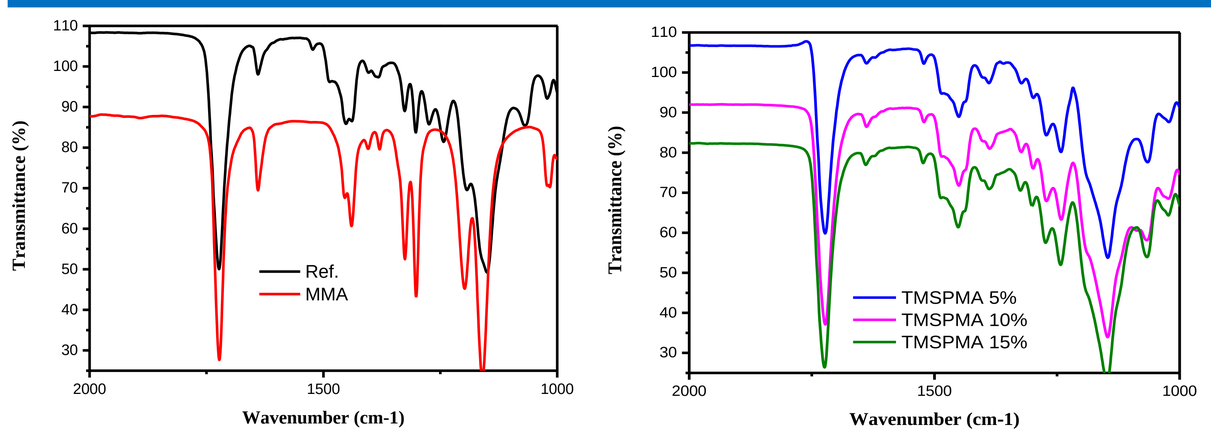
Step 3 Apply adhesive to specimen

Contents table

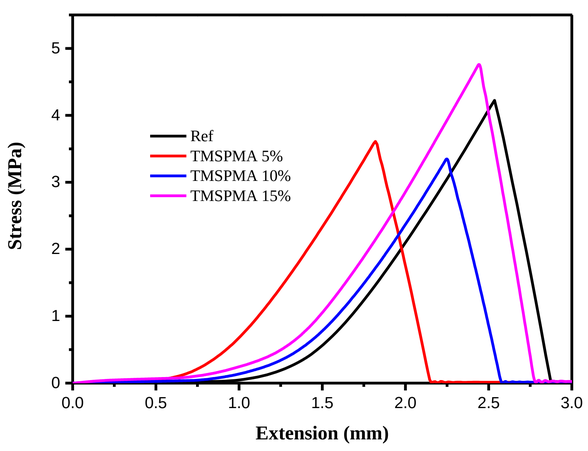
SAMPLE	Ref (wt%)	Sample (wt%)
Reference	1	0
TMSPMA 5%	0.95	0.05
TMSPMA 10%	0.9	0.1
TMSPMA 15%	0.85	0.15

Results

FT-IR

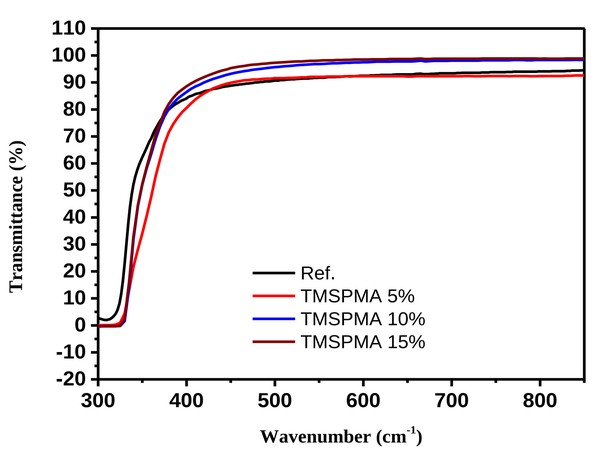


UTM



SAMPLE	Peak strength
Reference	4.223
TMSPMA 5%	3.61
TMSPMA 10%	3.34
TMSPMA 15%	4.75

Transmittance



SAMPLE	Peak strength
Reference	4.223
TMSPMA 5%	3.61
TMSPMA 10%	3.34
TMSPMA 15%	4.75

Conclusion

- Polymerization was confirmed by decreasing the peak of C=C at 1640 cm^{-1} according to radical reaction through FT-IR
- Transmittance increases as the content of TMSPMA increases.
- Contact angle increases to 10 % of TMSPMA content, and the contact angle decreases from 10 % of TMSPMA content.
- Peak strength decrease to 10 % of TMSPMA content, and the peak strength increases from 10 % of TMSPMA content.
- As Wettability increases, Adhesion Strength increases. Proper content is important.

Acknowledgement

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