

Improvement of the mechanical property of the silicone foam filled with bio-based poly tannic acid

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Silicone foam containing poly tannic acid (TA) was prepared and characterized in terms of the morphological and mechanical properties, and specific gravity. SEM, EDS, and TGA analyses were applied to analyze the poly TA-filled silicone foam systematically. The addition of 2 wt.% of poly TA contributed to an increase in the expansion ratio and the reduction of the specific gravity of the silicone foam. In addition, the improvement of the Young's modulus and tensile strength was accomplished by the addition of poly TA. The reason of the improvement of the mechanical property is the crosslinking reaction between the hydroxy group in the poly TA and the hydride group in the hydride-terminated polydimethylsiloxane (H-PDMS). The amount of the hydroxy-terminated PDMS was decreased due to the addition of the hydroxyl group of poly TA. Therefore, vinyl-terminated PDMS could be readily crosslinked with H-terminated PDMS. As a result, the mechanical properties could be improved with the reduction of specific density. This work was supported by the Technology Innovation Program (20010265) funded by the Ministry of Trade, Industry and Energy (MOTIE, Korea).