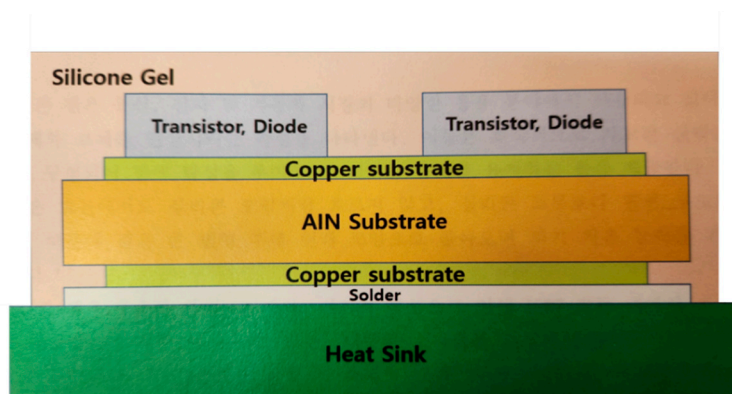


# Preparation of a Crosslinked Poly(imide-siloxane) for Application to Transistor Insulation

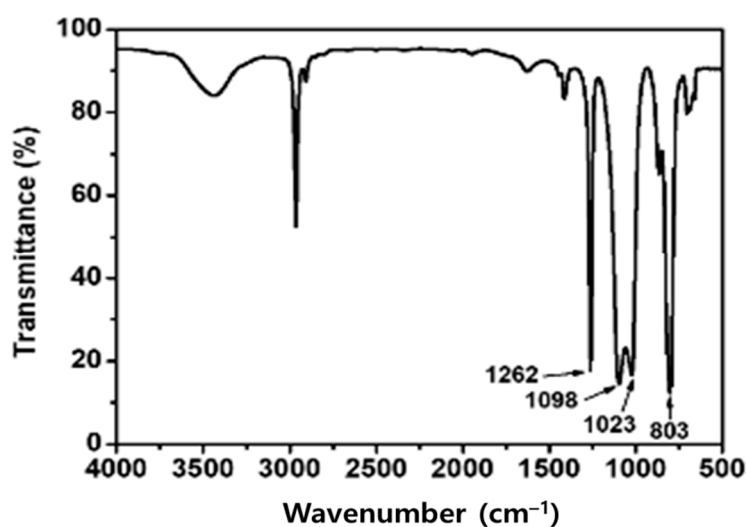
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**Figure S1.** Schematic diagram of a typical IGBT module.

## Characterization of IGBT silicone gel

The structure of the commercial IGBT silicone gel was identified by FT-IR spectroscopy. Absorption bands were observed at 1023 and 1098  $\text{cm}^{-1}$  due to Si-O-Si stretching, and the absorption band of 1262  $\text{cm}^{-1}$  is due to the symmetrical deformation of the  $-\text{CH}_3$  group of  $-\text{Si}(\text{CH}_3)_2-$  group. The absorption band of 803  $\text{cm}^{-1}$  corresponds to Si-C group of Si- $\text{CH}_3$  vibration. It is considered that the silicone gel is a PDMS-based material because the IR spectrum of the gel is practically the same as that of PDMS.



**Figure S2.** FT-IR spectrum of the commercial IGBT silicone gel.

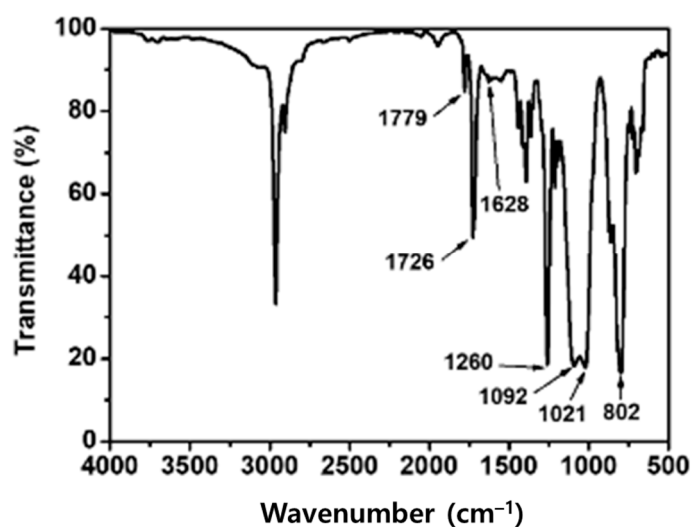


Figure S3. FT-IR spectrum of Allyl-PI.

Table S1. Remaining percent of Si-H groups.

Temperature (°C)	Residue (%)
Before Crosslinking	100
40	91
70	80
100	53
120	17
140	3

Table S2. Thermal properties of the commercial IGBT silicone gel.

	T <sub>d</sub> (°C)		Thermal diffusivity (m <sup>2</sup> /s)	Density (g/cm <sup>3</sup> )	Specific heat capacity (J/g • K)	Thermal conductivity (W/m • K)
	T <sub>5</sub> <sup>a</sup>	T <sub>10</sub> <sup>b</sup>				
IGBT silicone gel	378	422	0.12	1.00	1.67	0.19

<sup>a</sup> Temperature at which a sample exhibits 5 wt% decomposition in a nitrogen atmosphere; <sup>b</sup> Temperature at which a sample exhibits 10 wt% decomposition in a nitrogen atmosphere.

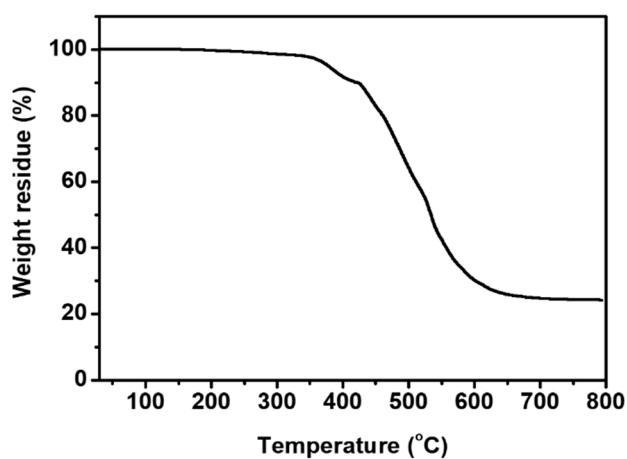


Figure S4. TGA curve of the commercial IGBT silicone gel.

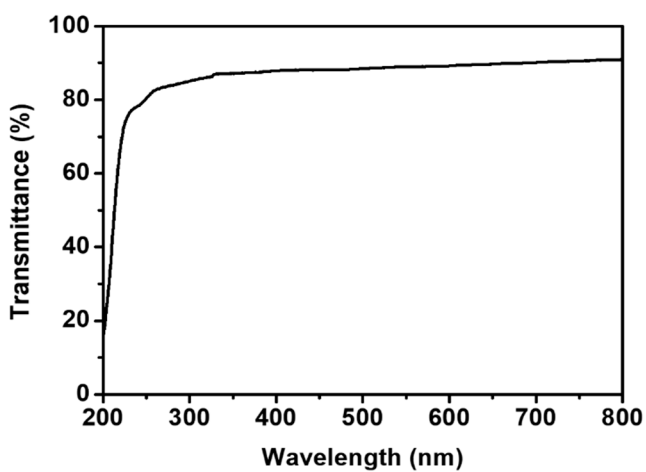


Figure S5. Transmittance of the commercial IGBT silicone gel.

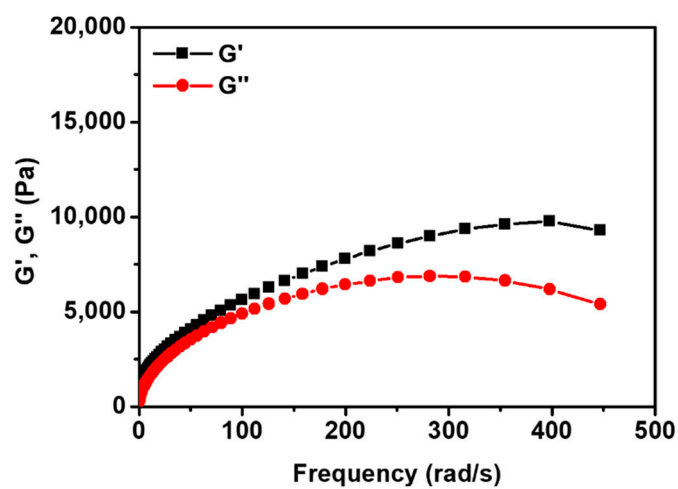


Figure S6. Storage modulus ( $G'$ ) and loss modulus ( $G''$ ) of the commercial IGBT silicone gel.