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# The effect of hard segment length on the thermal and mechanical properties of polyurethane/graphene oxide nanocomposites

Pashupati Pokharel<sup>1,2,\*</sup>, Sunwoong Choi<sup>1</sup> and Dai Soo Lee<sup>2,\*\*</sup>

<sup>1</sup>Department of Polymer Science and Engineering, Hannam University, Daejeon 305-811,  
Republic of Korea

<sup>2</sup>Department of Semiconductors and Chemical Engineering, Chonbuk National University,  
Jeonju 561-756, Republic of Korea.

## Abstract

The segmental length correlating properties of polyurethane (PU) in its nanocomposite system with graphene oxide (GO) were investigated by preparing the two different PU matrixes (S-PU and L-PU) with different hard segment (HS) length by changing the polymerization procedure. Here, an increase in the segment length of PU was favored for the high tensile strength of the GO/L-PU nanocomposites due to the strong secondary bonding during extension, while the less availability of the interaction between GO and HS of L-PU was responsible for lowering the modulus of GO/L-PU nanocomposites. In particular, with 4 wt% of GO incorporation in L-PU (PU with longer HS length), a 6.8-fold increase in tensile strength and 4.8-fold increase in Young's modulus without sacrificing the elongation at break were achieved. The crystallization and melting point of both PU matrixes were largely affected by the insertion of the GO sheet in the HS of PU.

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\*Corresponding author: Tel.: +82426298860; fax: +82426298854.

\*\*Corresponding author: Tel.: +82-632702310; fax: +82-632702306

E-mail addresses: ppokharel2008@gmail.com & ppokharel@gm.hannam.ac.kr (P. Pokharel);  
daisoolee@jbnu.ac.kr (D.S. Lee).

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