

Self-healing properties of poly(methyl methacrylate) derivatives through the reversible reaction with maleimide functionalized graphene oxide

변금섭, 김성현, 채혜린, 임지형, 차상호<sup>†</sup>

경기대학교 화학공학과

(sanghocha@kyonggi.ac.kr<sup>†</sup>)

Self-healing materials were proposed to be used as coating materials, because of the capability of healing injury. A series of poly(methyl methacrylate) derivatives were synthesized, which consisted of thermally reversible moiety furfuryl-2-(methacryloyl) ethyl carbamate(FMAECM) and photo-reversible moiety 2-cinnamoyloxyethyl methacrylate(CEMA). Also we prepared maleimide functionalized graphene oxide(mGO), which was used as a cross-linker for thermally reversible Diels-Alder reaction. The structures of intermediates, polymers and Diels-Alder reaction were confirmed by <sup>1</sup>H-NMR, fourier transform infrared spectroscopy, thermal gravimetric analysis and differential scanning calorimetry. Additionally, the photo reversibility and the self-healing performance of polymer were studied by pencil scratch method, optical microscopy and tensile testing. The results show that the dual self-healing effects of these polymer films were controlled by heat and photo stimuli.