

**Production of 3D printing filament using recycled Polypropylene with exfoliated graphene as composite filler and their application to 3D printing**

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Recycling plastic waste has been serious global problem in recent years, and application to 3D printing can be one of the smartest methods to recycle plastic waste. Herein, we produced 3D printing filament using recycled Polypropylene (rPP) by single screw extruder. Composite 3D filament was also manufactured using electrochemically exfoliated graphene (EEG) as composite filler by 10 wt%, 20 wt%. The graphene and rPP were well dispersed with great homogeneity, so composite 3D filaments were uniformly produced. The thermal properties of filaments were increased as graphene content increased, and the mechanical property was also improved when EEG was 10 wt% compared to recycled PP, while rather decreased when EEG was 20 wt%. 3D structures were successfully manufactured using these filaments by conventional 3D printer. By recycling plastic waste, great advantages can be expected in environmental and economical perspective.