

Summary

During the experiment I produced polymer nanocomposites by reinforcing H145F type polypropylene with layered silicate clay mineral (Montmorillonite – MMT C15A, C20A, C93A) and adding chemical coupling agent, maleic-acid anhydride grafted polypropylene (Polybond 3200 - PPgMA). The additives were compounded into the polymer matrix in different weight percent. In some composition the montmorillonite were grinded by attrition milling to achieve higher mechanical parameters of the composite. I compounded the different components by extrusion, and the test pieces were made by injection molding. I measured the melt flow properties and tensile, flexural and charpy impact test were carried out. The MMT had positive effect on the mechanical properties of polypropylene. Depending on the concentration, it resulted in a minor (2-6%) improvement. The best results were measured by adding 5% MMT. By using 1% PPgMA further improvements could be achieved (6.5-10%). The composites reinforced with C20A, and C93A montmorillonite types had slighter effect on the properties related to those of PP+5%MMT (15A), ~5% improvement could be achieved. This can be explained by the fact that the silicate plates in these types of clays are closer to each other than in the case of C15A, thus using the same technology the polymer melt's embedding between the plates, could be less effective. The grinding didn't show significant changes in the mechanical properties, a slight decrease was found, however better results were measured compared to polypropylene. In my research work I focused to determine the montmorillonite's and the coupling agent's effect on polypropylene properties. I examined the mechanical properties and processability (melt volume rate) and analysed the effect of grinding the montmorillonite on the nanocomposite properties.