

Electronic Supplementary Information

**Preparation of high-performance anti-aging polypropylene by modified nano-TiO₂
and Calcium sulfate whisker grafted acrylonitrile composite PP**

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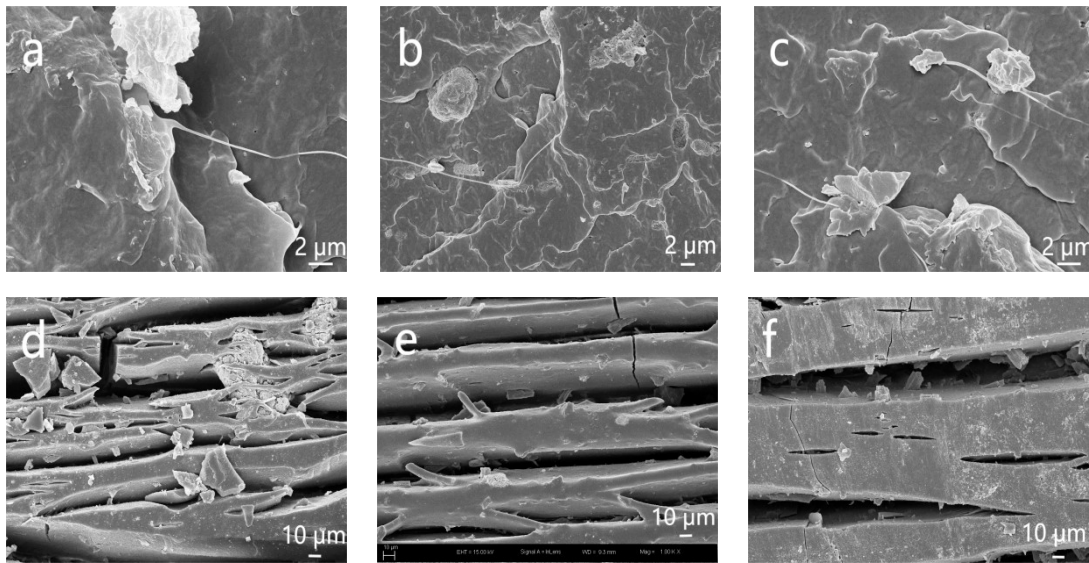


Fig.S1 SEM analysis plots of TiO₂/PP (a、 d), KH570-TiO₂/PP,(b、 e) and TiO₂-PAN/PP(c、 f) before and after 1000h of aging.

As shown in Figure S1, obvious aggregates can be seen on the SEM image of TiO₂/PP composite material, indicating that TiO₂ is not uniformly dispersed in the PP matrix and the surface shows a trend of multi-layer distribution, indicating poor compatibility between TiO₂ and PP(Figure S1a). Through the aging SEM image, we can see that not only many cracks appear, but also obvious aggregates, and the fiber part breaks, which proves that the compatibility of TiO₂ and PP is not good, resulting in poor anti-aging performance(Figure S1d).The multi-layered distribution at the interface of the modified KH570-TiO₂/PP composite material is reduced, and although there are still agglomerates, the volume of the agglomerates decreases and the dispersibility improves(Figure S1b).The modified KH570-TiO₂/PP composite showed better anti-aging properties compared with the TiO₂/PP composite, which was due to the modification of the coupling agent, so that TiO₂ could be more evenly dispersed in the PP matrix(Figure S1e).The dispersion of TiO₂-PAN/PP composite obtained after grafting acrylonitrile has not been effectively improved, which is due to the incompatibility between acrylonitrile and PP itself. The coupling agent coating provides the active site for acrylonitrile grafting, but the ungrafted acrylonitrile still

has polarity and is difficult to be compatible with PP, which is manifested in the dispersed aggregates in the PP matrix, which will lead to the reduction of anti-aging performance(Figure S1c).Some agglomerates can still be observed on the surface of TiO₂-PAN/PP composites after 1000h of aging, which is caused by the poor compatibility between PAN and PP(Figure S1f). This phenomenon will also cause the fracture of the surface. Although the anti-aging performance of grafted acrylonitrile is significantly improved, the mechanical properties obtained still fail to meet the actual requirements of high performance-polypropylene.