

## Morphology and thermal properties of recycled polyacrylonitrile fiber blends with polyethylene terephthalate: Microstructural characterization

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### ABSTRACT:

The compounding of rPAN/PET [polyacrylonitrile/poly(ethylene terephthalate); 30/70, 50/50, and 70/30 wt %) using a melt-blending technique was the main focus of this investigation. An X-ray diffraction study indicated the possibility of interphase boundary interactions between the polymer matrices in the blends. The differential scanning calorimetry results showed that varying the ratios of rPAN in the blends marginally improved the processing temperature of PET. The thermogravimetric analysis revealed that the addition of PET up to 70% increased the thermal stability of the blend, and adding more than 70% of PET resulted in poor adhesion between the matrix and phase. On the basis of the results obtained, we propose a general understanding of how the morphology and the mechanical and thermal properties of the blend could assist in the development of rPAN blends with PET, rather than disposing of the viable materials as wastes.