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NJSTAR® NU-100

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NJSTAR[®] NU-100

NJSTAR NU-100 is the first non pigmenting β -nucleator that promotes the formation β -crystals in polypropylene. Certain properties of polypropylene are dramatically altered by this change in crystal structure. Achieving a balance between high impact strength, high stiffness and high heat distortion temperature requires a combination of factors such as processing conditions and crystalline forms.

Dependent upon the concentration of the nucleating agent and the thermal conditions used during processing, **NJSTAR NU-100** modifies the morphology of polypropylene to achieve specific properties in the material. Some of the benefits of β -nucleation include outstanding impact strength (Figure 2), high flexural modulus (Figure 3) and exceptional heat distortion temperature (Figure 4).

β -crystalline PP enhanced thermal properties

Since β -crystals have a lower melting point than α -crystals, all resins nucleated with **NJSTAR NU-100** show a decrease in the melting point to $\sim 150^{\circ}\text{C}$, which allows a reduction in extrusion and processing temperatures (Figure 1). This lowering of the melting point, which broadens the processing conditions, is beneficial for the compounding stage and end-processes being film applications, thermoforming and rotational moulding. In addition, elevated crystallization temperature is also achieved, enabling a reduction in cycle time in injection-moulding.

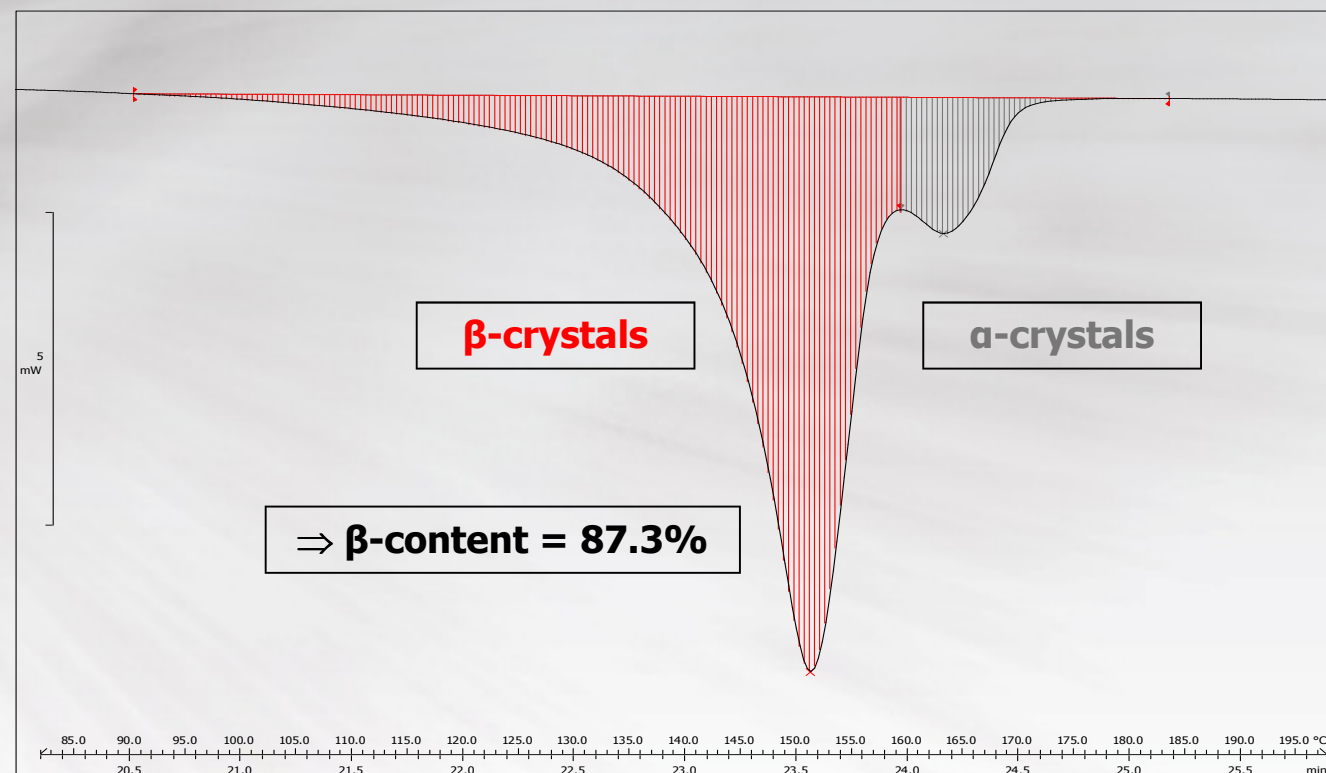
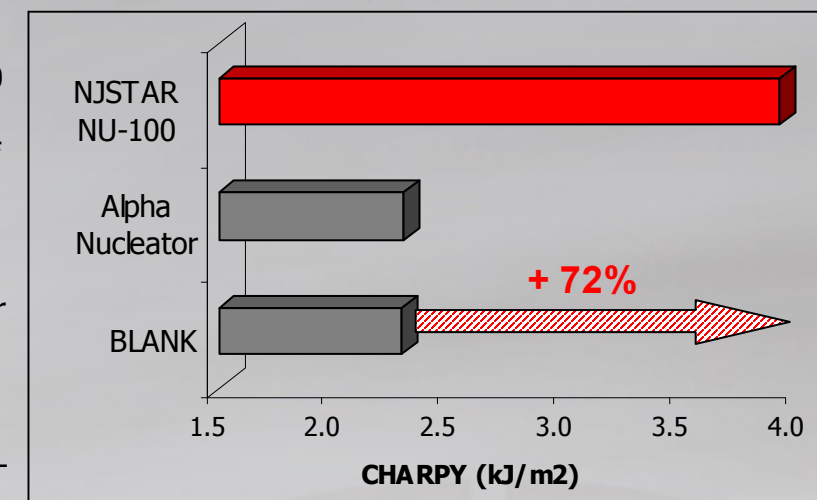


Figure 1. DSC Thermogram

High Impact Strength

The addition of **NJSTAR NU-100** drastically improves the **impact strength** at room temperature of the material compared to an un-nucleated sample or α -nucleator. Significant improvements were also achieved with the β -nucleator in impact strength at 0°C and below. These results are extremely important in applications such as sewerage pipes and plumbing systems, where high impact strength is required.



High Flexural Modulus and high HDT

Formulations containing **NJSTAR NU-100** could also be designed to achieve a high flexural modulus material with no loss of impact strength. The high stiffness that **NJSTAR NU-100** offered was also associated with a superior heat resistance compared to the blank sample. These results suggest the potential end-use applications of NU-100, for example, in hot water pipes and under-the-bonnet automotive applications, where HDT values well above 100°C would overcome problems such as softening of the material.

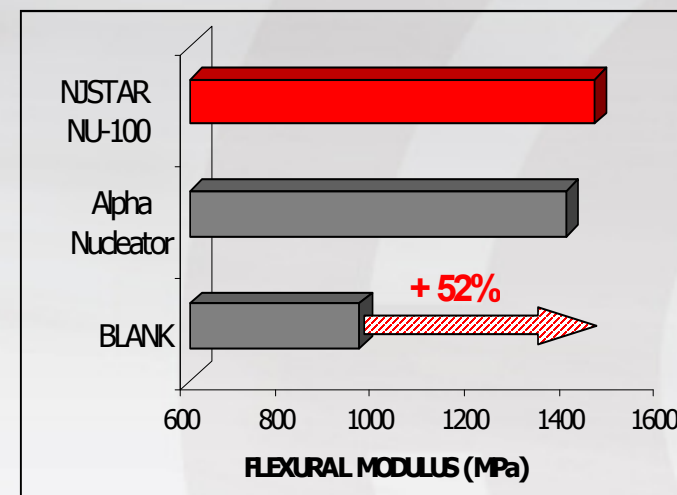


Figure 3. Flexural modulus in Homopolymer PP

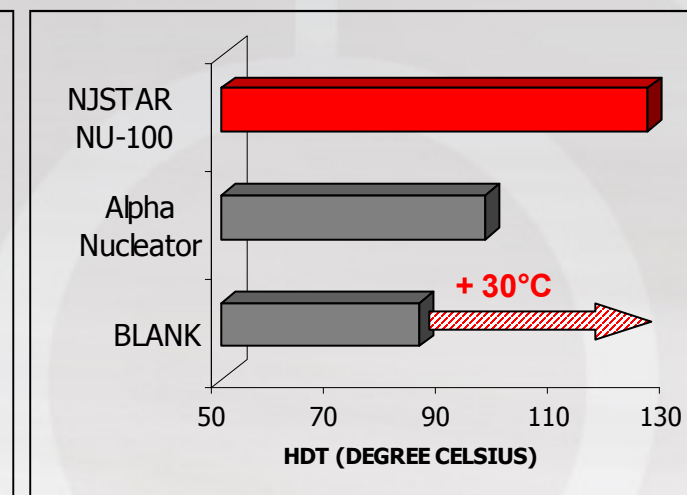


Figure 4. Heat distortion temperature in Homopolymer PP

NJSTAR NU-100 has been approved by EFSA and the FDA, conditions of use A through H for all foodstuffs up to a maximum concentration of 0.2% by weight of the polymer.