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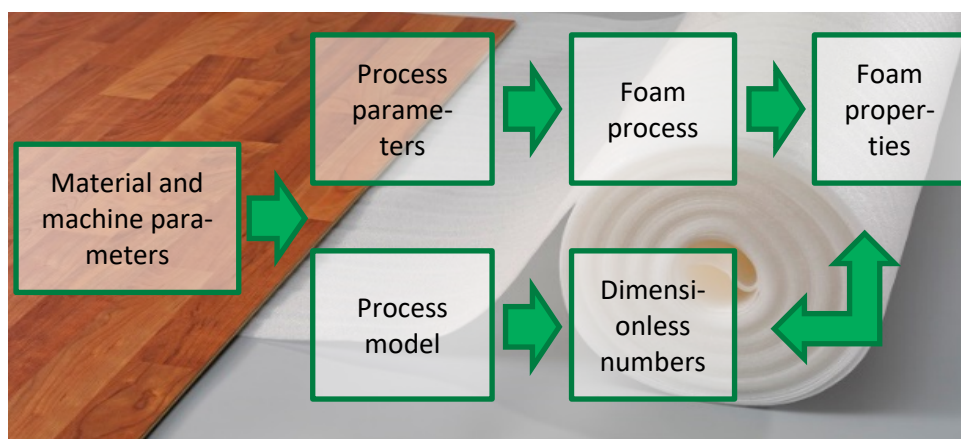
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Master's thesis

Modelling flow and foaming processes of semi-crystalline thermoplastics in foam sheet extrusion

Foamed sheets made of thermoplastic materials are used, among other things, for thermal and sound insulation systems (Fig. 1). The production of these foam sheets with CO₂ as an environmentally friendly, physical blowing agent is an important step towards the sustainable production of foam products. The modelling of the flow and foaming behaviour and the crystallisation at the exit of the extrusion die have so far mainly been investigated experimentally and cannot yet fully be described analytically.



Picture: Casando

Fig. 1: Foamed sheets as insulation material, existing modelling approach

The relationships between process parameters (melt temperature, die pressure), blowing agent formulation (type and quantity of blowing agent) and the foam sheet properties have not yet been sufficiently modelled. An Excel-based model developed at the IKV establishes a relationship between the process conditions and the foaming behaviour, but has so far only been used for amorphous plastics.

Your task is to extend the existing model to semi-crystalline plastics like polypropylene. After literature research on the subject, you will expand the model and validate the assumptions with the help of existing experimental measurements.

Basic knowledge of plastics rheology and modelling is helpful, but not essential. Working from the home office is very well possible.

If you are interested in an exciting work on this future topic, please feel free to contact me.

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