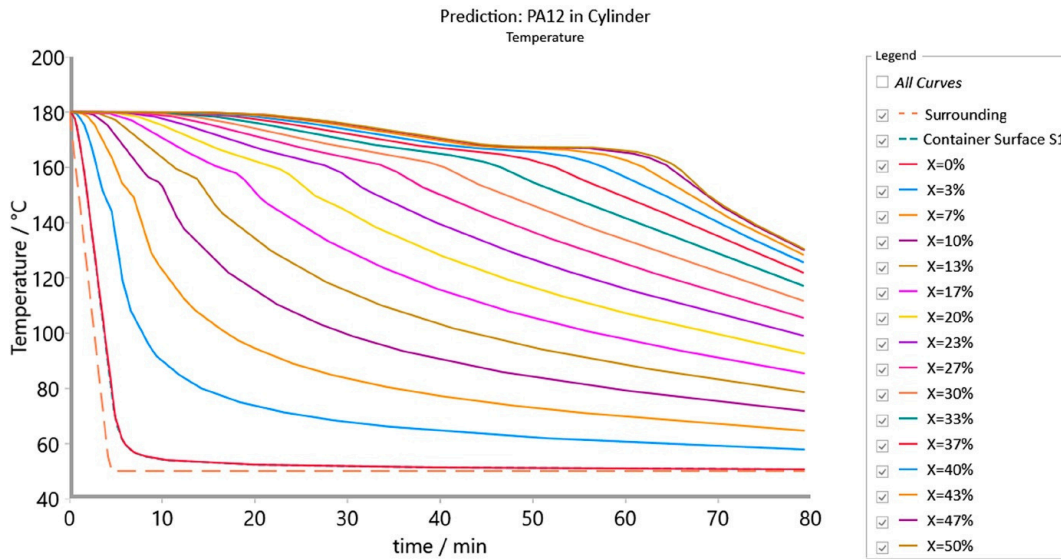


## Crystallization of PA 12 in a Cylinder

In the context of industrial manufacturing processes, such as injection molding or additive manufacturing (e.g., selective laser sintering [SLS]), it is imperative to understand the dynamics of crystallization rates and the subsequent degree of crystallinity. Accurate knowledge of these parameters is essential for ensuring the quality of the material during processing, as they directly impact the resulting product's physical and mechanical properties.

As illustrated in the figure, the simulation model demonstrates the crystallization process of PA12 within a cylinder rod with a diameter of 10 centimeters. The surrounding temperature undergoes a rapid decrease from 180°C to 50°C, subsequently stabilizing at a constant level. The surface temperature undergoes a rapid decrease, while the temperature in the center exhibits a slow decline. The exothermal effect of polymer crystallization manifests as a wave on the temperature curves between 150°C and 170°C. In those regions, where the cooling rate is faster, crystallization occurs at a lower temperature.



Prediction of the crystallization behavior within the cylinder rod