

The faculty of Engineering of the Vrije Universiteit Brussel invites you to attend the public defense leading to the degree of

**DOCTOR OF ENGINEERING SCIENCES**

of **Prakhar Pouranick**

The public defense will take place on **Thursday 4<sup>th</sup> July 2024 at 5:00 pm** in room **D.2.01** (Building D, VUB Main Campus)

To join the digital defense, please click [here](#)

Meeting ID: 330 928 400 378

Passcode: zs5nYV

## THERMAL DEGRADATION STABILITY AND FIRE BEHAVIOUR OF POLYURETHANES

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## Abstract of the PhD research

When Otto Bayer and his colleagues at IG Farben in Leverkusen, Germany, first produced polyurethane (PUR) in 1937, they probably had no idea of the global impact it would make. Today, due to a wide range of polyols and isocyanates, two crucial materials required to produce most PURs, PUR can be tailored to suit different applications, making it highly versatile and adaptable to different areas of daily use and industry, such as automobiles, building insulation, coatings, bedding, upholstery and many other applications. However, the proximity of these materials to us humans in everyday life makes them sometimes dangerous due to their flammability and possible lower thermal stability at high temperatures, making them an ideal candidate for detailed study of their thermal degradation and degradation mechanism. Furthermore, there is a current interest in evaluating the flame retardancy, thermal stability and degradation mechanism of bio polyol-based polyurethanes (PURs), which are expected to replace PURs made from petrochemical-based polyols in the future. Given the broad range of applications for polyurethanes and the various available raw materials for the polyols (bio-based, polyfunctionality, morphology, molecular weight), this study aims to examine how these new building blocks will impact the thermal stability and flame retardance of the resulting PUR products.