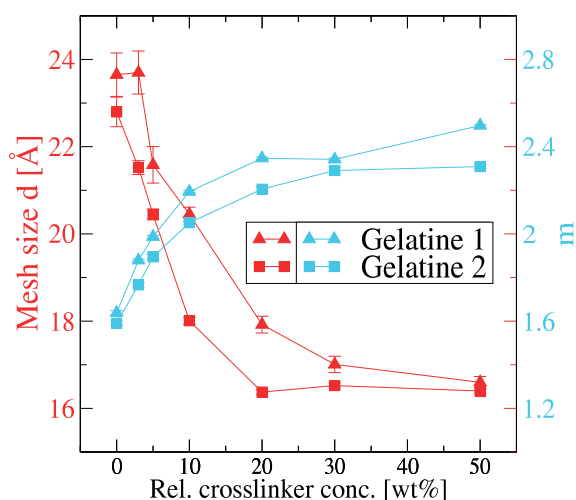


Biobased binders for stone wool

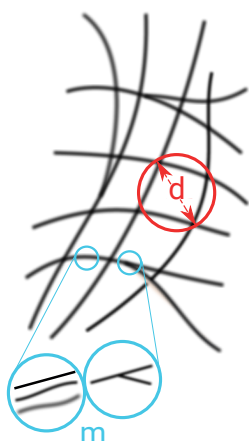
In this project, researchers from University of Copenhagen and ROCKWOOL International A/S collaborated to study the molecular scale structure of biobased binders for stone wool using small-angle X-ray scattering (SAXS).

Stone wool from ROCKWOOL International A/S consist of mineral fibres held together by a binder. It is desired to replace conventional binders with biobased binders.

The challenge is to develop binders that have these desirable properties while maintaining the same long term mechanical stability and resistance to environmental factors in the final product as when conventional binders are used. The experiments show correlations between the molecular structure of the binder material and the macroscopic properties of the final product.



The obtained SAXS curves show a variation with increasing amount of cross-linker in the binder material. With more cross-linker, the mesh size of the binder decreases until a concentration of about 20%. This is correlated to functional properties of the final stone wool product.



What we did

- ROCKWOOL International provided samples of 2 different gelatine-based binders with varying amounts of cross-linker.
- The cross-linked gel samples were measured with SAXS at the Niels Bohr Institute at University of Copenhagen.
- The data was analysed with a correlation length model, giving information about the mesh size in the polymer gel networks of the binder.
- The data was compared to macroscopic measurements of functional properties of binders and the final stone wool product.

What's next?

Further studies of the binder materials could include studying the molecular structure of the binders during the curing process.

“This project has shown that SAXS is a very interesting technique to study our binder material on molecular length scales. This might help us to better understand and predict macroscopic properties of our binder material and the final stone wool products.”

- Dorthe Lybye, Programme Director, ROCKWOOL International

In the LINX project, researchers at leading Danish universities collaborate with scientists in industry to solve industry relevant problems using advanced neutron and X-ray techniques. The Arleth group at University of Copenhagen contributes with their expertise in small-angle scattering techniques.

Read more
linxproject.dk

Contact
Lise Arleth: arleth@nbi.ku.dk