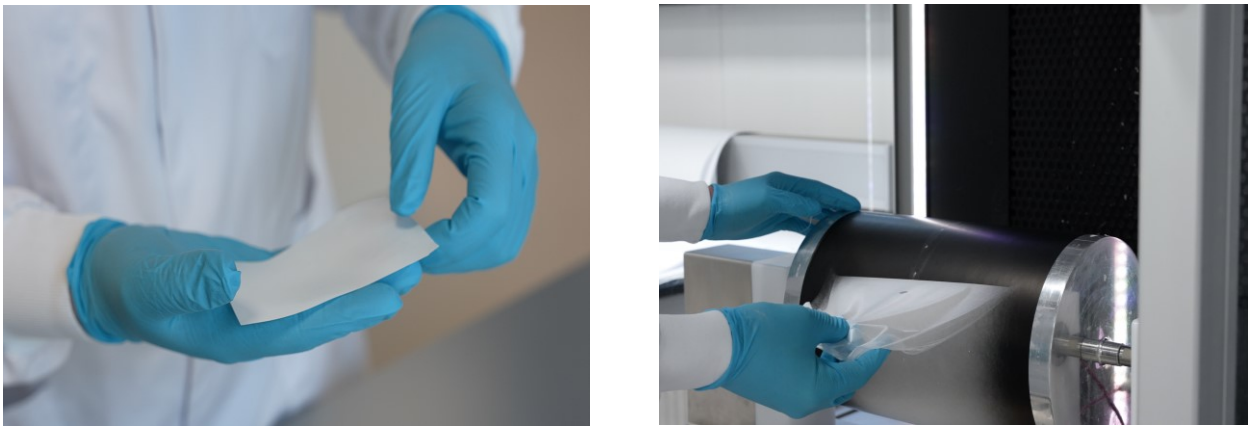
Flexible Ceramic Filter Media
CERFLEXFILT

Flexiramics pure ceramic non-woven mats excel in separating microparticles at high fluxes even in extreme conditions due to their submicron fiber structure and high porosity of up to 95%. These mats offer a unique combination of microparticle retention, high fluxes, and chemical stability, surpassing competing solutions. Further development is needed to enhance the microstructure, focusing on adjusting porosity and pore size to cater to various applications, as well as grafting new materials onto the mats to impart additional physicochemical properties required for specific applications. This is the focus of the CERFLEXFILT project.

THE CONTEXT

Flexiramics mats are an excellent candidate to be used as separation medium in industrial filtration, as well as a membrane and catalyst support , especially when extreme conditions are necessary. While separation performance has been demonstrated, Flexiramics can also tune the material to offer different ranges of properties. Therefore, Flexiramics reached out to the INNOMEM OITB, to characterize their material in detail, to test it and to explore the effect of post-treatment techniques (grafting).



Flexiramics material

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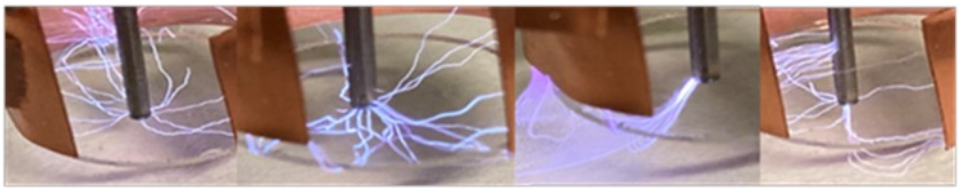
THE CHALLENGE

In order to enter new markets like the industrial filtration market and renewable energy market, the properties of the Flexiramics material need to be further optimized to be implemented. Therefor the INNOMEM OITB, is consulted to assist Flexiramics with some capabilities and characterisation techniques not present in the company.

University of Twente and EMI Twente characterized the current product and analysed several samples. Fraunhofer IKTS explored the potential for further surface modification of Flexiramics material using grafting.

Set up to measure burst pressure



Picture series of atmospheric pressure plasma process

Contact angle measurement of a hydrophobized Flexiramic surface of 142 °

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RESULTS & CONCLUSION

The CERFLEFILT project was successful and the following conclusions can be drawn:

University of Twente and EMI Twente leveraged their expertise in conducting physical tests and analyses of Flexiramics' material. Drawing upon their proficiency in physical sciences, the researchers thoroughly analyzed the material's physical properties. By clarifying these physical attributes, the collaborative efforts led to the potential for further developing the materials towards enhanced performance, unlocking possibilities for new applications.

Fraunhofer IKTS focused its efforts on exploring surface modification techniques for Flexiramics' material. Leveraging their deep understanding of chemical treatments and surface engineering, researchers at the institute collaborated closely with Flexiramics to develop novel methods for enhancing the material's chemical properties.

TECHNIQUES USED

In the CERFLEXFILT the following characterization services and capabilities of the INNOMEM OITB were used:

- Tensile strength, Porosity, Pore diameter, Pore size distribution, Material thickness, Burst Pressure test, Defects, Chemical composition (FTIR), Bubble point, Thermal decomposition (TGA) feasible at INNOMEM partners University of Twente and EMI Twente.

- Grafting techniques like chemical or plasma based surface modifications as well as contact angle measurements are feasible at INNOMEM partner Fraunhofer IKTS

For more information, you can get in touch with us by sending an email to p.dewit@emi-twente.nl or ralf.wyrwa@ikts.fraunhofer.de

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