

# Visualization of the morphology of cellular polymers made easy

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SABIC is one of the world's largest petrochemicals manufacturers and has operations in over 50 countries with a global workforce of over 35,000 employees. The main focus of SABIC's European Polymer Processing Department is material and application development for market-related processing techniques. For testing, the Phenom Desktop SEM is used to characterize, amongst others, the cell morphology of cellular materials and dispersion of polymer blends.

Polymers are large molecules consisting of many repeated subunits. Because of their broad range of properties, both synthetic and natural polymers play an essential and ubiquitous role in everyday life. Their large molecular mass relative to small molecule compounds produces unique physical properties, including toughness, viscoelasticity and a tendency to form glasses and semicrystalline structures.

The list of synthetic polymers includes synthetic rubber, phenol formaldehyde resin, neoprene, nylon, polyvinyl chloride, polystyrene, polyethylene, polypropylene, silicone and many more. At SABIC, one of the activities we use SEM for is to visualize cell structures of polymer foam or powder, image analysis and dispersion of polymer blends.

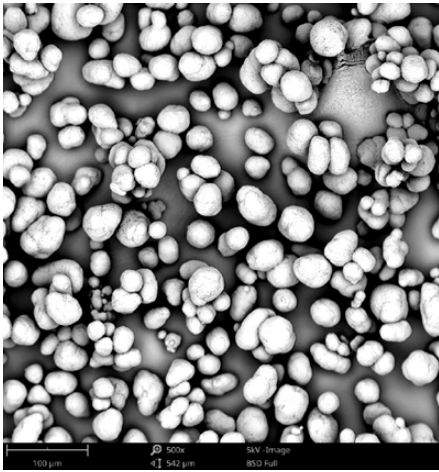
## Why Phenom Desktop SEM

We were looking for a SEM that would give us the opportunity to image our samples up to nano scale but still was in our budget. We choose the Thermo Scientific™ Phenom Pro Desktop SEM because it is easy to operate yet it is a versatile and high tech instrument. Because the Phenom Pro Desktop SEM is easy to use, it is easy to get instructions and do the imaging yourself.

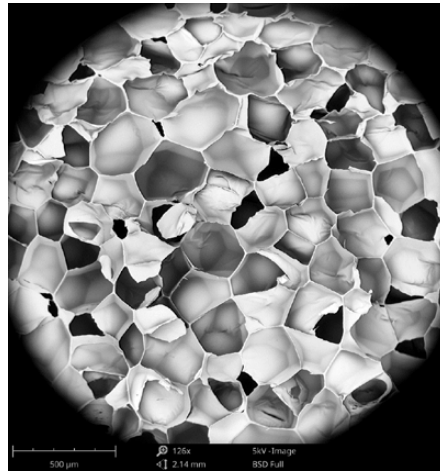
To reduce cost on outsourcing these activities, we invested in the Phenom Pro Desktop SEM. The key benefits are the minimal need for training to operate the instrument, fast testing time and the interface is user friendly. A person is trained in 30 minutes and is then able to perform an analysis from sample preparation to acquiring an SEM image. The resolution serves our needs, making this ideal for screening many samples.

## The solution

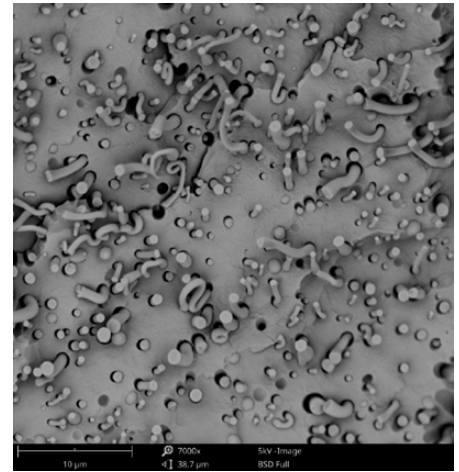
The output of the Phenom Desktop SEM is clear and ready to report. Standard image analysis can be performed after acquiring the image, e.g. drawing lines and measuring lengths. More options are available with the correct licenses, e.g. 3D roughness reconstruction. Overall, we are happy to use the Phenom Pro Desktop SEM since its data is valuable for our research and it is easy to operate.



SEM image of small agglomerates of polymer powder produced in a reactor.



SEM image of cellular structure of polymer foam.



SEM image of dispersion of a polymer blend of two materials.



#### SABIC

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