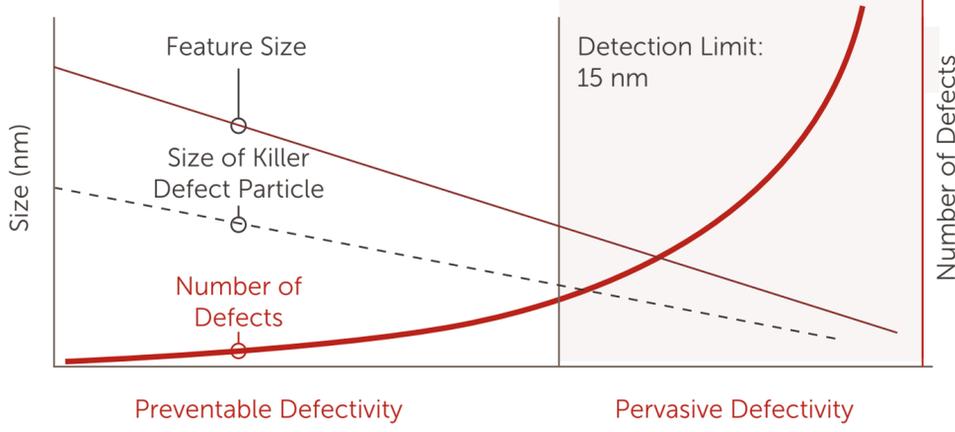


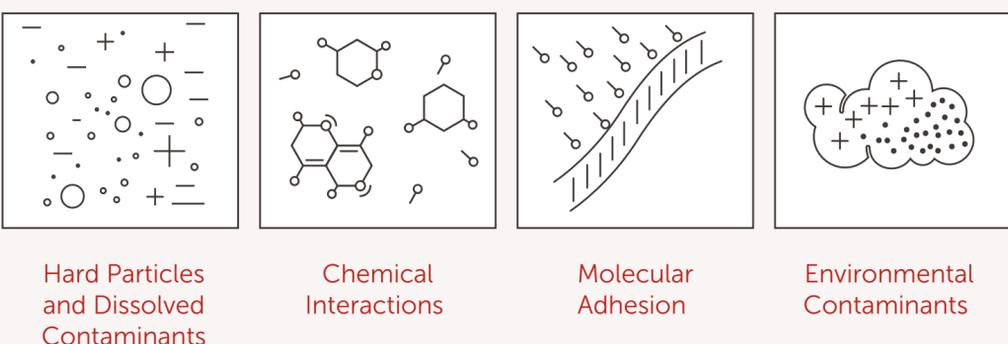
# How (and Why) to Address Pervasive Defectivity

With feature sizes in semiconductor devices dropping below 10 nm, killer defects get smaller in size as well. Even the most advanced detection system can only find particles as small as 15 nm, requiring a fundamental shift in thinking. Rather than thinking defectivity is **preventable**, we must think of it as being **pervasive**. Traditional defectivity prevention is still valuable but now we need to do more.



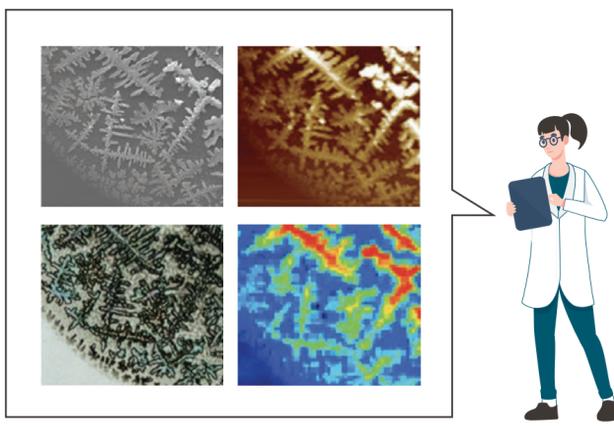
## NEW TECHNOLOGIES MEAN NEW KINDS OF DEFECTIVITY

A traditional approach to defectivity focuses on particle size, with the goal of preventing killer defects. A modern approach has the goal of extending the device lifespan, and has to consider many more possibilities:



## NEW TECHNIQUES TO DISCOVER DEFECTIVITY

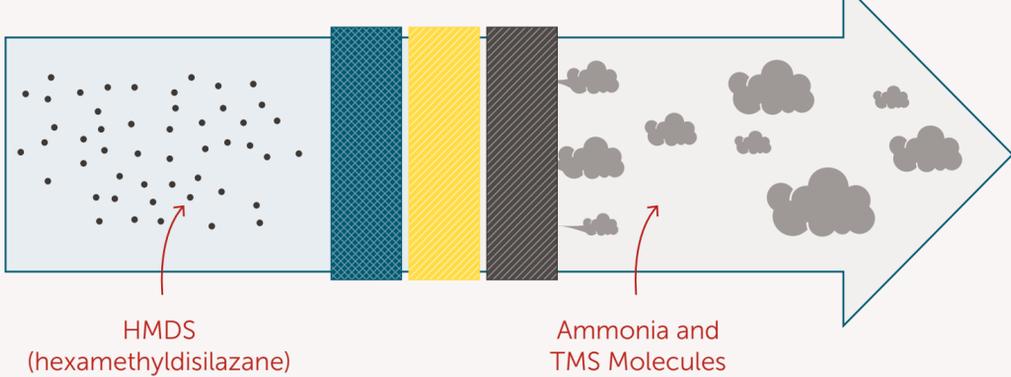
In part, creating new detection methods is needed to address pervasive defectivity. One promising area is multimodal imaging of materials, which can yield new analyses and inferences.



## ADDRESSING MOLECULAR CONVERSION

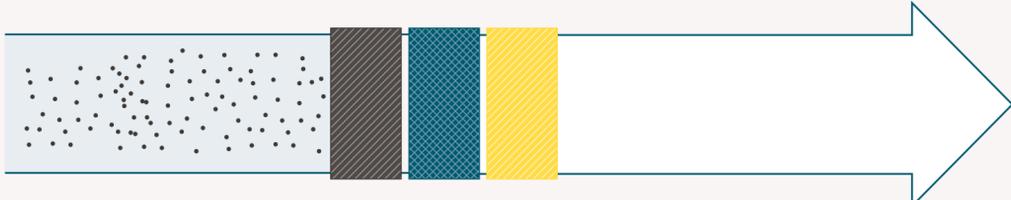
It is critical to be watchful for unexpected interactions and molecular conversion when dealing with new materials. For example, airborne molecular contamination (AMC) chemical filtration, when not carefully staged, can convert HMDS to TMS, which may degrade optical systems.

### Standard Filtration Approach



To avoid these kinds of conversions, chemical filter media need to be staged properly for the application.

### Specialized Filtration Approach



## OUTGASSING AND ENVIRONMENTAL CONTAMINATION

Introducing new process gases can also create the potential for new environmental interactions, particularly with organics and moisture that are not captured by traditional filters. Additionally, the very infrastructure that is used to transport chemicals and gases within a fab can lead to unwanted interactions with the materials from which the initial infrastructure was built.



Additional steps, such as gas purification, must be considered.

## LEADING COLLABORATION ACROSS THE VALUE CHAIN

Coordinated thinking is required across the semiconductor manufacturing value chain to handle pervasive defectivity. Entegris is perfectly positioned to facilitate that effort, with our expertise in maintaining material purity, understanding chemical interactions, and forward-looking research.



Learn More

[www.entegris.com/defectivity](http://www.entegris.com/defectivity)