

SMART

PUFP Semiconductor

for PREDICTIVE MAINTENANCE

Nanoparticle is a marker of equipment state. When an equipment or a particular part needs maintenance or replacement, nanoparticle may be coming out from equipment. As a result, abnormal level of particle detection could be the sign of equipment maintenance. In addition to traditional time-based maintenance, predictive maintenance utilizing nanoparticle detection would reduce unexpected dead-time of equipment and reduce manufacturing cost.



Photo: Entegris FOUF



Photo: Brooks ATS

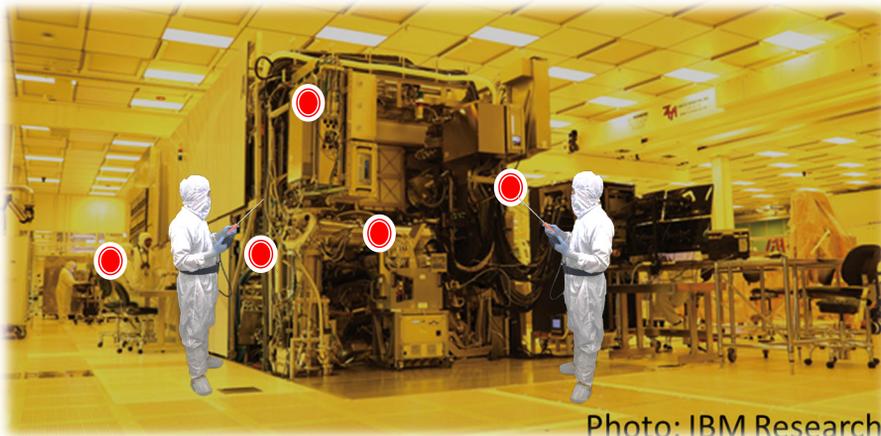


Photo: IBM Research

Your hand can reach parts, then PUFPP can also access and monitor any piece of equipment due to compact sensor size and mobility. You may locate PUFPP inside of FOUF (or ATS) in order to monitor nanoparticles that are generated by processing equipment. Every second, PUFPP will measure particle concentration change and report real-time data to you and the control tower wirelessly. By real-time detection of nanoparticles, the equipment that would require maintenance would be easily identified.



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for EQUIPMENT HEALTH MONITORING

Equipment health monitoring is essential to the semiconductor industry for reducing the equipment dead-time and ultimately reducing manufacturing cost. Using PUFP that monitor nanoparticle, an equipment-state marker can help to find early failures before scheduled maintenance. PUFP can provide step-by-step monitoring features; 1) Walk-through monitoring, 2) Identification of unhealthy equipment, and 3) specific identification of unhealthy parts or process.

Walk-through Monitoring: Although FAB's air flows from top to bottom, nanoparticles will diffuse everywhere while microparticles follow air stream. During walking-through FAB, PUFP will detect nanoparticles diffusing from unhealthy equipment near path. PUFP is extremely sensitive and will not miss to detect any nanoparticle.



Unhealthy Equipment Identification



Unhealthy Equipment Identification: When abnormal nanoparticle exposure is detected during Walk-through monitoring, PUFP will lead the examiner to close in on unhealthy equipment that is generating nanoparticles to FAB. When closing in on unhealthy equipment, level of nanoparticle concentration will increase. PUFP will detect the increase.

Particle Source Detection of Unhealthy Equipment: PUFP will identify unhealthy parts of equipment generating nanoparticles. PUFP has excellent feature of spatial-resolution. Although the unhealthy part is small or narrow, PUFP will identify the location of part precisely. After identifying the unhealthy part, maintenance would be followed.

Particle Source Detection of Unhealthy Equipment

