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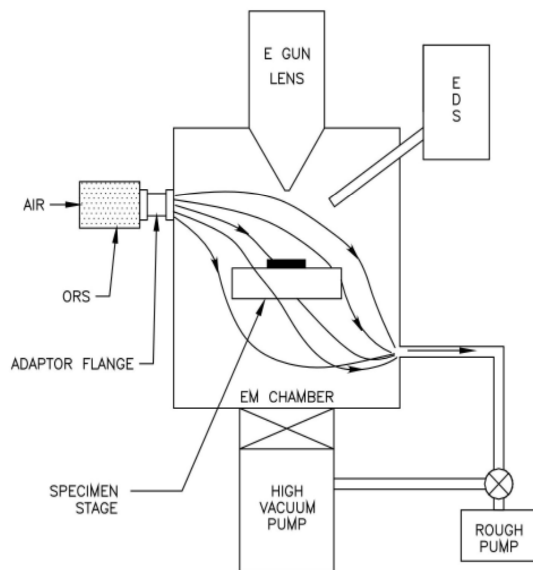
Evactron Downstream Process

Oxygen radicals are the active cleaning species of the Evactron Process produced from the driving gas, air. These are developed in the Evactron ORS, Oxygen Radical Source that is mounted onto a SEM or FIB spare port. O radicals produced in the ORS localized plasma are transported by the system pressure differential. These O radicals have zero kinetic energy so high energy or hot detrimental sputtering effects on specimens or delicate components are non-existent. Pumping system differential depends on two parameters: 1. System pumping speed, 2. Conductance. The Evactron process is optimized when these parameters are greatest. The volume between the ORS and pump port positions will be cleaned as the O radicals are transported downstream through the chamber.



The Evactron Process operates only during SEM/FIB pump down when the chamber pressure is in viscous flow, 600mTorr. This is the optimum pressure for the Evactron process to clean [ash] **hydrocarbon contamination.** The mean free path at 600mTorr is 83µm and as the O radicals contact chamber surfaces and specimens they convert hydrocarbon contamination into H_2O, CO_2 and CO molecules that are pumped away leaving a clearer chamber and specimens. Ultimate pressure and pump down periods decrease after each Evactron cleaning cycle. The improvement can be usually noticed immediately by the absence or decrease in black scan square intensity. A strategic mounting location for the ORS is a port that positions contamination sources between the port and the pumping port – usually any port on the EM chamber.

The Evactron process is fast, simple and non-destructive. Beam induced contamination artifacts are diminished and UV light from the plasma plume desorbs water vapor keeping high resolution SEM imaging crisp. Critical Line Edge measurement precision is maintained and induced measurement carry over eliminated enabling sub-nanometer CD metrology.

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