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The Effect of N2 Plasma on Atomic Hydrogen Surface Recombination S. SMITH, C.Y. TAI, MKS Instruments — Remote plasma sources are increasingly being used with reducing chemistries for radical generation in on wafer applications. The repeatability of atomic hydrogen output from wafer to wafer and matching of performance between chambers is paramount and is a topic that receives a great deal of attention. The atomic radical recombination on plasma facing surfaces is known to have a strong impact on hydrogen radical output of remote plasma sources. Presented here are results showing that the source output can be attenuated by up to 40% as a result of exposing the surface to nitrogen plasma, which chemically modified the wall resulting in a high recombination surface. It is also shown that subsequent hydrogen processing can convert the surface back to its low recombination state. Additionally this "seasoning" or "conditioning" effect is shown to be on a time scale of days. Measurements of radical concentrations were made with a calorimeter; surface analysis is done with XPS as well as high resolution SEM.

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