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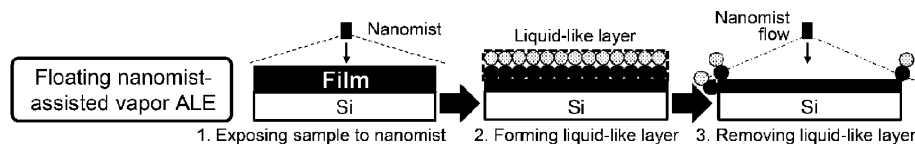
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(54) Title: AN ETCHING PROCESSING METHOD, A PROCESSING METHOD AND A SEMICONDUCTOR MANUFAC-
TURING SYSTEM

FIG. 1



(57) Abstract: A new cyclic etching method, wet-like atomic layer etching (ALE), or wet-like (plasma) ALE, or nanomist (plasma) ALE for damage-free and selective isotropic etching using mist/vapor/plasma at low temperature, that can minimize the damage from sputter effect in plasma ALE, high temperature treatment in thermal ALE during volatilization, and nanostructure damage in wet ALE, has been developed. The modification layer after the reaction with mist or plasma can be removed by dissolving it in a highly volatile mist flow. The phase with intermediate properties between mist liquid phase and vapor phase, named mist-vapor phase or nanomist phase that can maintain the wet properties of liquid phase at the minimal mist size is proposed here for nanodevices applications. By using the Leidenfrost effect, the sample surface can be modified and/or etched by the floating nanomist-assisted vapor.



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