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(54) **Title:** PROCESSING SYSTEMS AND PLATFORMS FOR ROUGHNESS REDUCTION OF MATERIALS USING ILLUMINATED ETCH SOLUTIONS

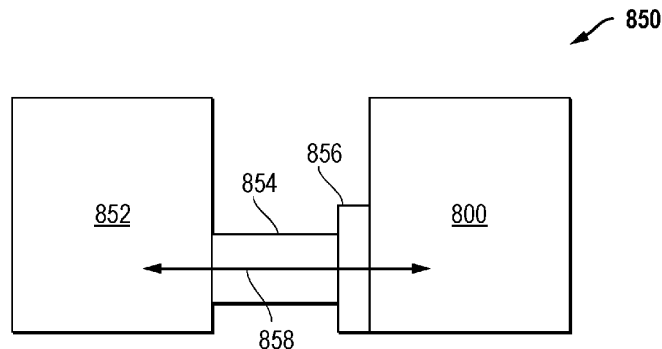


FIG. 8B

(57) **Abstract:** Processing system and platform embodiments are described that illuminate etch solutions to provide controlled etching of materials. The processing systems and platforms deposit a liquid etch solution over a material to be etched and illuminate the liquid etch solution to adjust levels of reactants. The liquid etch solution has a first level of reactants, and the illumination causes the liquid etch solution to have a second level of reactants that is different than the first level. The material is modified with the illuminated etch solution, and the modified material is removed. The delivery, exposing, and removing can be repeated to provide a cyclic etch. Further, oxidation and dissolution can occur simultaneously or can occur in multiple steps. The material being etched can be a polycrystalline material, a polycrystalline metal, and/or other material. One liquid etch solution can include hydrogen peroxide that is illuminated to form hydroxyl radicals.

[Continued on next page]



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