

APPARATUS AND METHOD FOR DYNAMIC CONTROL OF PLATED UNIFORMITY WITH THE USE OF REMOTE ELECTRIC CURRENT

ABSTRACT

5 An apparatus for electroplating metal on a substrate while controlling plating uniformity includes in one aspect: a plating chamber having anolyte and catholyte compartments separated by a membrane; a primary anode positioned in the anolyte compartment; an ionically resistive ionically permeable element positioned between the membrane and a substrate in the catholyte compartment; and a secondary electrode configured to donate and/or divert plating current to
10 and/or from the substrate, wherein the secondary electrode is positioned such that the donated and/or diverted plating current does not cross the membrane separating the anolyte and catholyte compartments, but passes through the ionically resistive ionically permeable element. In some embodiments the secondary electrode is an azimuthally symmetrical anode (e.g., a ring positioned in a separate compartment around the periphery of the plating chamber) that can be
15 dynamically controlled during electroplating.

Fig. 2B