CLAIMS

1. An apparatus for uniform metallization on substrate comprising:

an immersion bath containing at least one metal salt electrolyte;

at least one set of electrode connecting to an independent power supply;

a substrate holder holding at least one substrate and electrically connecting with a conductive side of the substrate, the conductive side of the substrate exposed to face the electrode;

at least one ultra/mega sonic device for generating ultra/mega sonic wave in the immersion bath; and

a rotating actuator rotating the substrate holder along its axis in the acoustic wave field, so as to result in a uniform overall power intensity distribution across the substrate in an accumulated time;

wherein the apparatus further comprises

a vertical actuator oscillating the substrate holder along normal direction of propagation direction of the ultra/mega sonic wave; and

an acoustic reflector placed with a tilted angle relative to the ultra/mega sonic device, avoiding forming standing wave across the surface of the substrate.

2. The apparatus of claim 1, wherein the acoustic reflector is tilted at its width direction to form the tilted angle relative to the ultra/mega sonic device, so as to reflect the acoustic wave upwards and out of the immersion bath.

3. The apparatus of claim 2, wherein the ultra/mega sonic device and the tilted acoustic reflector set the path where the acoustic stream flows horizontally and then out of the immersion bath.