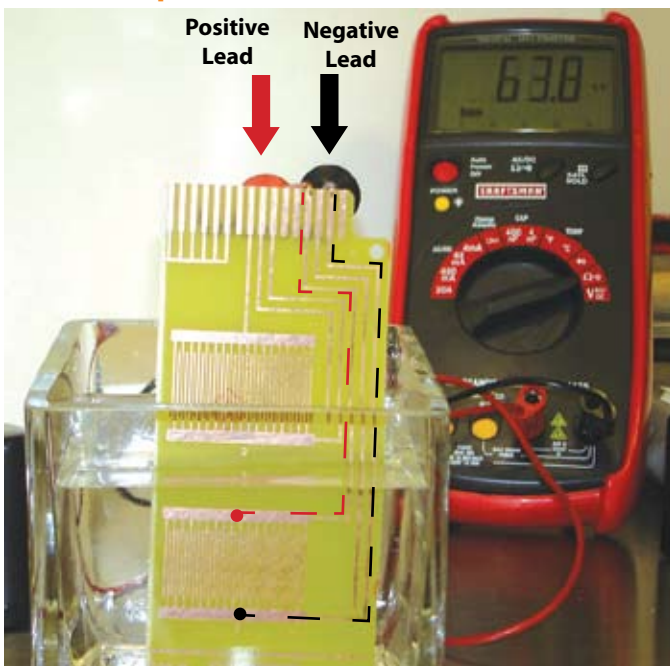




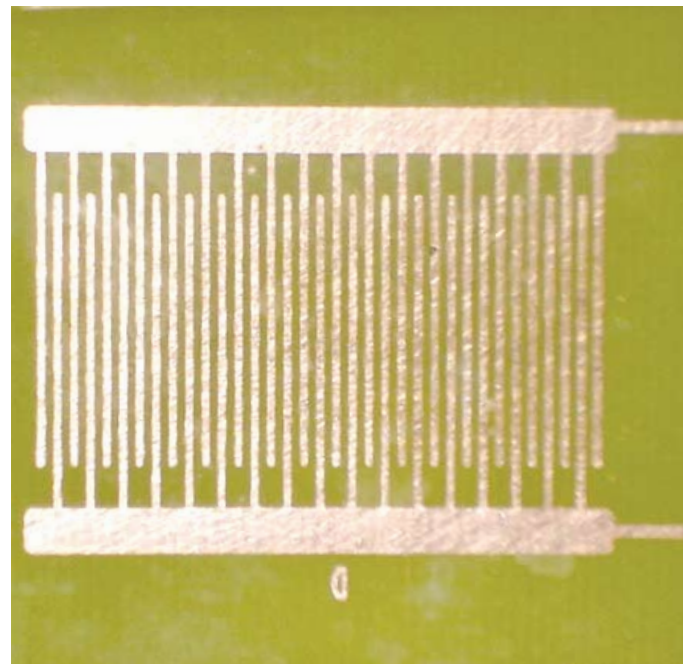
## Repellix™ Direct Current Polarization Electrical Test

Integrated Surface Technologies™ (IST) provides Repellix™, a supermolecular ceramic coating for water protection of electronics. The following tests were conducted in IST's laboratory to determine the extent to which Repellix protects an electrical circuit from water induced electrical shorts. Water is electrically conductive, and provides a conductive path between exposed leads, which is why devices frequently fail when they are dropped into liquids or are accidentally splashed. In this test, IST quantified the resistance of Repellix to water shorting, and the effect of immersion time on the performance.

### Test Description



Test Set Up A – Submerged Comb Structure, Ohms vs Time



Close Up View of Submerged Comb – Note No Physical Contact Between Top and Bottom Combs

In this test, we utilized a comb structure that is normally an open circuit, since no physical contact exists between the upper and lower combs. The combs were connected to a Ohmmeter to measure the response of the circuit to the test conditions. In air, the resistance between the adjacent leads was infinite. We tested three different combs with three different surfaces: uncoated bare copper, hydrophilic coated

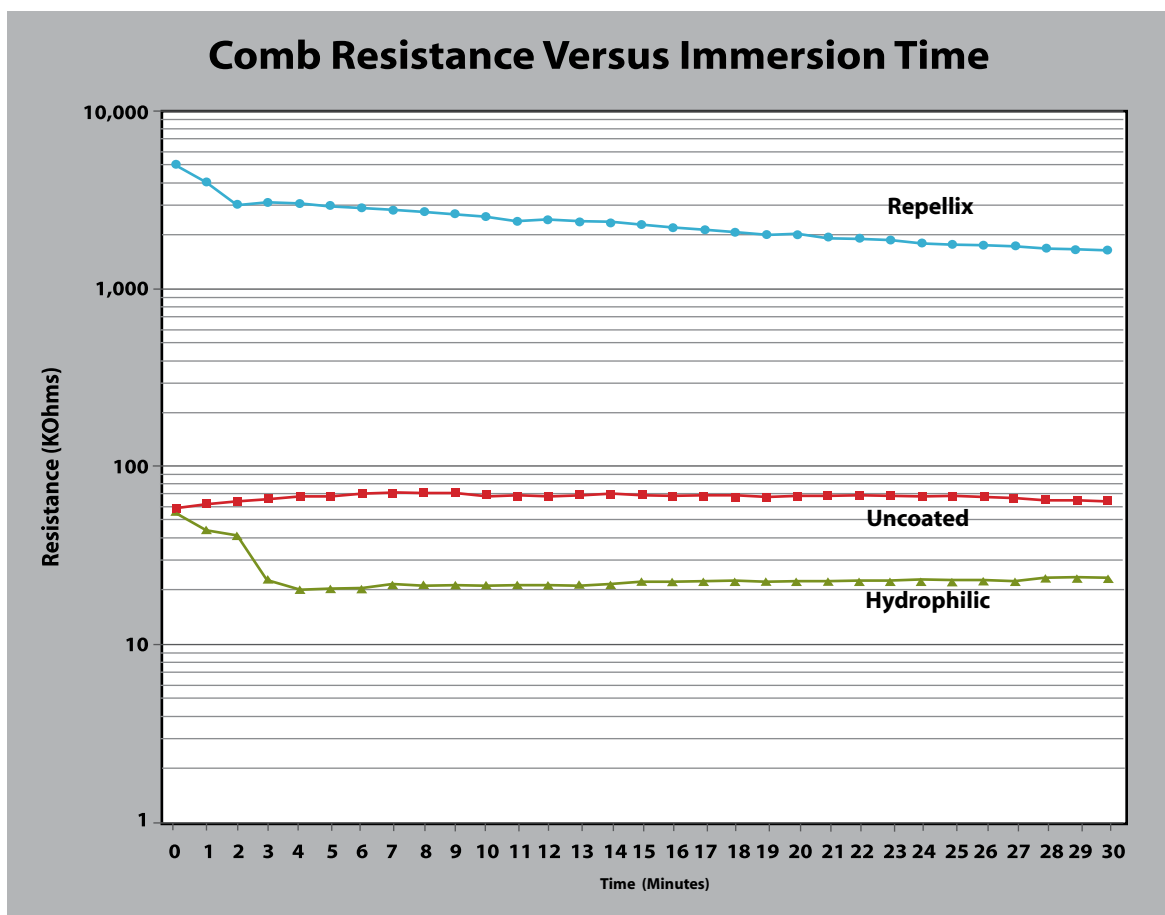
copper, and Repellix super-hydrophobic coated copper. When immersed in an aqueous solution, the bare copper comb fingers are able to conduct electrons through the solution, due to the fact that the resistance of the solution is much less than air. However, when coated with Repellix, the resistance of the immersed circuit is nearly the same as if it remained in dry air.

## Test Description

Electrical comb structures were immersed in water for 30 minutes, and a DVM measured the resistance. Repellix was between 25X and 85X more resistive than an uncoated board.

As a control, we coated one sample with a hydrophilic coating of similar thickness and material composition as Repellix– but without the hydrophobicity. The excellent Repellix performance is due to the repelling of the water.

## Test Results



Repellix maintains high resistance even when submerged in water for 30 minutes