

IW0006

Enabling mobility with plasma processes: An epic journey in power

David Christie

Advanced Energy, Fort Collins, CO, United States

dave.christie@aei.com

Advances in electronic technology have led to the rise of mobility, with disruptive solutions now outpacing consumer anticipation and expectations. Users of mobile devices may expect their data to be synchronized across platforms at the time of creation. This technology is now widely integrated into our personal transportation platforms, which also include powerful digital communications and control infrastructures.

Manufacture of the electronic devices for recording, processing, storing, transmitting and displaying data is based on industrial plasma processes which have been highly developed to deposit sophisticated thin films and modify surface properties and topography. These plasma processes have one thing in common: they require a source of power. Electrical power is predominant in industrial thin film plasma processes. Power systems for plasma processes have gradually transitioned from simple to very sophisticated precision power delivery systems with internal computers and connectivity to OEM and end user control systems.

Predominant deposition technologies include sputtering and plasma enhanced chemical vapor deposition (PECVD). Patterning of surfaces and interconnects is accomplished with various plasma based etch technologies. These systems are powered with various combinations of power sources, with increasingly advanced capabilities. DC and pulsed DC power are used for magnetron sputtering; RF power is used for etch and CVD plasma sources, and for substrate bias in many applications. Plasma processes can exhibit arcing, which can damage the product being coated and reduce yield. Therefore, arcs must be detected and extinguished in a timely manner to minimize damage. Arc detection and handling has been the focus of considerable development effort.

The evolution and radically increasing capability of DC, pulsed DC and RF power solutions that enable plasma processes used to manufacture mobile devices will be reviewed, with a view to current capabilities.

Keywords

plasma
power
sputtering
etch
pecvd