High Resistivity Materials for Improved Thermal Inkjet Printheads

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Abstract

High resistivity materials have been investigated as the resistor element in thermal inkjet printheads. The motivation to replace the well-known TaAl or Ta-N resistors is convincing. With higher-value resistors, parasitic losses can be reduced significantly, improving the head efficiency and lowering die temperatures. Further, lower current and higher voltages lead to simpler circuits and permit lower cost power supplies. To reap these benefits, several candidate materials have been investigated with a resistivity typically an order of magnitude or higher than TaAl and Ta-N (~250 micro-ohm cm). The motivation, material investigation strategy, electrical properties, structural properties, testing results, and thermal modeling will be discussed.

Biography

Michael Regan received his Ph.D. in Applied Physics from Stanford University in 1993. His thesis work focused on nanometer-scale phase separation in sputtered amorphous films (structural and electrical properties). For the next 3 years, Michael visited Harvard University as a post-doctoral fellow in the Dept. of Physics and Applied Sciences. His research emphasized surface science of liquids: structural properties, oxidation, capillary waves, self-assembly, wetting. Since 1996, Michael has been a Member of the Technical Staff at the Advanced and Applied Research Laboratories of Hewlett-Packard's Inkjet Supplies Business Unit. His latest efforts have focused on thin film technology and the thermal inkjet printhead.