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## Carbon Layer Application in Phase Change Memory to Reduce Power Consumption and Atomic Migration

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### Abstract

Phase change memory (PCM) cells with carbon buffer layer have been fabricated. Carbon layer reduced the heat dissipation through upper electrode, increasing the energy efficiency of PCM, reducing the power consumption. The element distribution in PCM cell after  $3 \times 10^5$  cycles proved that the carbon layer has successfully prevented atoms diffusion. After carbon layer being applied, the local high temperature during RESET in phase change material has been lowered. Hence, the higher viscosity at lower temperature has reduced atomic migration, beneficial to a good endurance.

**Keywords:** carbon materials; physical vapor deposition; thermal analysis; phase change memory

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