

Abstract Submitted
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Properties of Carbon Nanofuses for Permanent Data Storage

KEVIN LAUGHLIN, BYU — The amount of digital data being stored is increasing every year, so the needs for digital data storage have never been greater than today. The problem is that digital data is usually stored on devices that will last less than a decade, so the data needs to be migrated from device to device every couple years. An answer to this problem is a permanent data storage device that will hold data without the data corrupting for hundreds of years. I have been part of a group that has been working on a solid-state permanent data storage device that uses carbon nanofuses as the data cell. When a voltage bias is placed a carbon nanofuse, if it is intact a current will flow corresponding to a 1 bit. If the nanofuse is blown, no current will be allowed to flow across it, corresponding to a 0. Once a fuse is blown, it will remain in that state because it is a physical change that can't be undone under normal operating conditions. I have been working on understanding the physical properties of the carbon that is used to make these fuses including the resistances of the nanofuses with differing widths and thicknesses, the current required to blow the nanofuses, and the time it takes for the nanofuses to blow.

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