Permanent Solid-State Storage Using Metal-Oxide Fuses

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Executive Statement:

This is a novel, user-programmable, permanent solid-state storage technology that uses a unique oxidation process to prevent common failure mechanisms found in existing memory solutions.

Technology Overview:

This invention introduces a new form of permanent solid-state storage that utilizes metal-oxide-based fuses. Unlike traditional PROM technologies that destroy fuse material and can lead to dendritic failure, this method programs the storage by oxidizing the fuse material. This non-destructive process creates a highly stable and permanent memory solution. The technology is designed to offer cost and density comparable to current DRAM and Flash EPROM, making it a viable and superior alternative for a wide range of computing applications.

Key Advantages:

- Provides permanent, non-volatile data storage
- User-programmable, offering flexibility over traditional ROM
- Eliminates the dendritic failure mechanism common in older fuse-based technologies
- Utilizes a stable, non-destructive programming method (oxidation)
- Cost and density are competitive with mainstream technologies like DRAM and Flash

Problems Addressed:

- Addresses the volatility of DRAM and SRAM
- Overcomes the limited programmability of ROM and the wear-out issues of Flash
- Solves the reliability problems (dendritic failure) of previous permanent programmable memory (PROM)
- Provides a true "write-once, read-many" permanent storage solution without the physical drawbacks of older systems

Market Applications:

- Replacement for existing memory technologies (DRAM, SRAM, ROM, Flash EPROM) in computers and electronic devices
- Archival storage systems requiring long-term data integrity
- Integrated circuits for a wide array of electronics

- Licensing opportunities for major semiconductor manufacturers like Intel and IBM