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Ferroelectric films for non volatile-memory applications

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Abstract. Microelectronic applications of ferroelectric thin films have undergone a resurgence. Recent advances in deposition technologies and the achievement of bulk properties in thin films have enabled successful integration and fabrication of ferroelectric random access memories onto standard integrated circuits that combine high speed, complete non-volatility and extreme radiation hardness. Current research covers both the basic and applied areas in ferroelectric material science and semiconductor device development.

In this talk the evolution of solid state memory devices in conjunction with silicon technology will be described, and the increasingly important role expected from ferroelectric materials highlighted. In coupling ferroelectric thin film processing with Si technology several new problems have to be resolved. The device physics and design, the material choice for ferroelectric memories, thin film preparation and characterization, and the problems of fatigue and retention will be discussed.