

Master Thesis

Towards Low Variability Phase Change Memories

Short Description

While Phase Change Memories (PCM) are mostly known from their use in CD/DVD storage, they have recently gained attention for their potential in neuromorphic computing. In this context, PCMs serve as non-volatile analog memory, implementing artificial synapses for specialized AI hardware. The main challenge in this field is the large variability in tuning the PCM devices to a specific analog state which limits their performance in AI applications. The goal of this thesis is to investigate a new pre-processing step in the PCM fabrication to reduce this variability. More precisely, this step involves using an electron beam to write a nanoscale crystalline seed in the otherwise amorphous phase change material to create a well-defined and controllable initial state for all devices.

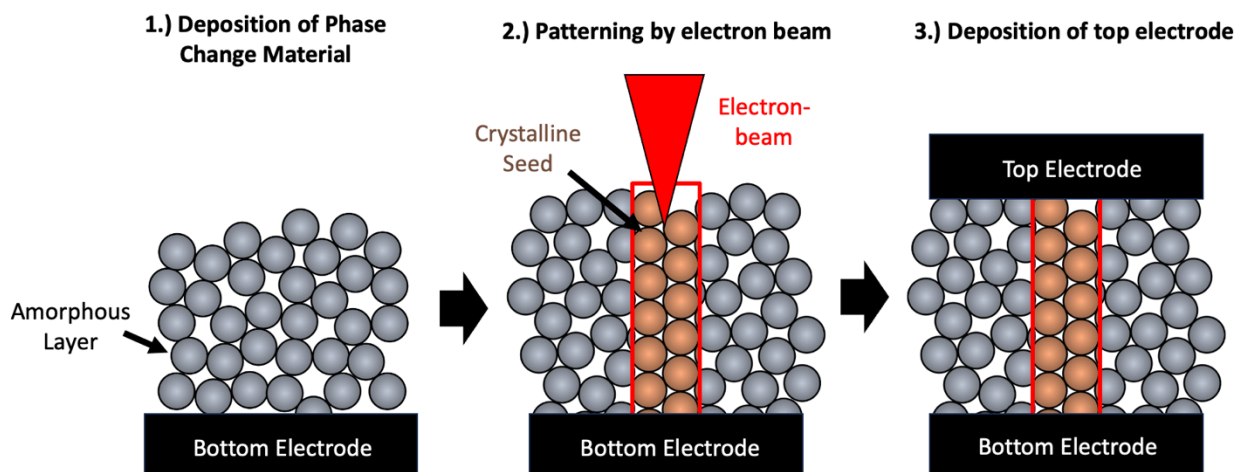


Figure 1: Pre-patterning of a Phase Change Memory (PCM) using an electron beam.

Type of Work

In this thesis you will:

- Fabricate phase-change memories in the clean room.
- Investigate the effect of the electron beam on the phase change material.
- Benchmark variants of the pre-patterned phase change memories in our lab.

The exact scope of the thesis can be tailored to your interests and skills.

Prerequisites

We are looking for a candidate with a general interest in clean room fabrication and electrical characterization in our lab. Previous experience in the clean room is beneficial but not required.

The scope of the thesis is tailored for a master thesis. If you are interested in a related topic for a Bachelor/Semester thesis, feel free to contact me.

Contact Details:

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