

Properties of materials used in microsystems

Objectives

- Collection of published data on properties of thin film and substrate materials used in micro/nanosystems including their dependence with elaboration technique, thickness, temperature, structure and other relevant parameters. Input of these data in a web database.
- Comparison of film materials elaborated by different techniques and of measurement techniques by a round robin test on a selection of materials.
- Design of test structures and methods for material characterization.

Partners involved

BUTE (Hungary), CSL (Belgium), Fr. IZM (Germany), Fr. IZM-M (Germany), Fr. IMS (Germany), IEF (France), IMEC (Belgium), IMT (Romania), IXL (France), LAAS (France), LETI (France), Polimi (Italy), WUT (Poland)

Summary of results

- Collection of physical-chemical, mechanical, thermal, electrical, optical and coupled properties for a first set of materials including semiconductors (c-Si, polysilicon), dielectrics (SiN_x, Si_xO_yN_z, SiO₂, glasses), metals (Ti, W, WTi, Pt, Cu, Al and Al Alloys, Au) and a polymer (BCB).
- Collection of data on a second, more open, set of materials including other semiconductors (e.g. porous Si), more polymers (notably photoresists), other metals, some metal oxides and nitrides, and some active materials (e.g. piezoelectric materials) (In progress)
- Round robin test on polysilicon, SiO₂ (thermal, PECVD, LPCVD), SiN_x (PECVD, LPCVD, arc deposition), gold (evaporated, sputtered, electrodeposited) and some other films (Al, Al alloys, PZT) (In progress)

Offer to industry

- MEMS-oriented Web-based database on material properties
- Elaboration and characterization of thin film materials

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Project status

- Data collection ongoing; continuation project approved