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**Challenges in thin film deposition of magnetoresistive Sensors**

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Magnetoresistive (MR) sensors play an important role in our everyday life as they are ideal for a vast variety of applications like the electronic compass, current detection, speed-, length- and angular-sensing. In general, the MR-effect describes a change of the electrical resistance of a material in an external magnetic field. The origin of the magnetoresistance effect could be for example the anisotropic (AMR), giant (GMR) or tunneling (TMR) magnetoresistance. Today, Sensitec produces different kinds of sensors based on AMR and GMR effect, while sensors based on TMR are still under development. In this talk we will explain the basic effects and their differentiation, and we will show a few examples of sensors and their application.

To control the magnetic and electric properties of such sensors, the control of the fabrication of the magnetic, metallic and insulating thin film layers and thin film deposition processes is crucial. The layer stacks for GMR and TMR sensors may contain more than 20 subsequent layers with thicknesses in the low to sub-nanometer range. Some layers with special functionalities have to be controlled to below 10ths of a nanometer. Some of the challenges in the fabrication of MR sensors with respect to the thin film deposition process will be detailed in this talk.

**Keywords**

magnetoresistive sensors

AMR

GMR

TMR

thin film deposition