Measurements of Tensile Stress Using Time-coded GMI of Amorphous Wire

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Time-coded GMI sensor has been studied with amorphous microwires employed as the sensing elements [1]. Using the sensor, influence of applied tensile stress on its sensing wire has been observed. In the presence of tensile stress, the GMI profile of the wire lowers the peak value and broadens the width (see Fig. 1-a)), which leads to a variance in GMI ratio and in time interval value ∆t. At zero external field (H_{ext} = 0) the maximum GMI ratio at an applied field of 530 μT reduced from 68% at zero tensile stress to 52% at 1800 MPa. A change in Δt with respect to the presence of the tensile stress was recorded within 0.26 ms at modulation signal pediod of 20 ms (50 Hz). Fig. 1-b) shows the stress induced time interval of the sensor at room temperature and zero external magnetic field. Accordingly, this preliminary result can be improved further to be able to apply to the tensile stress testing for amorphous wires.

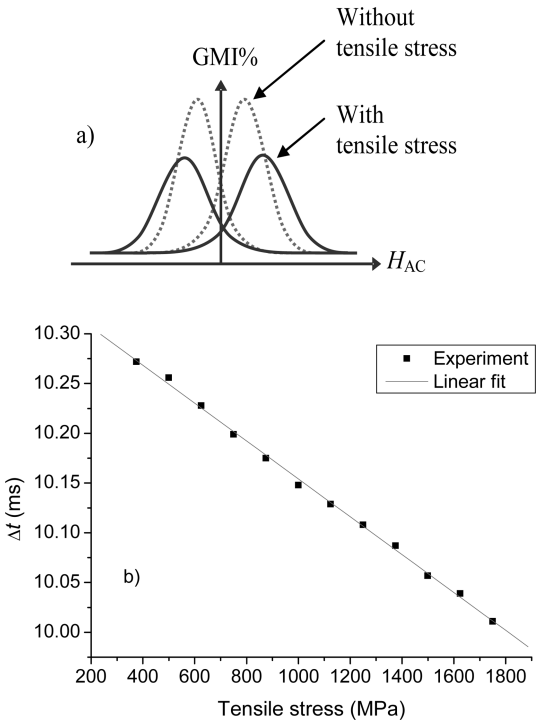

Fig. 1. Stress induced time interval of the sensor.

[1] X. H. Cao and D. Son, GMI magnetic field sensor based on time-coded principle, *J. of Magnetics*, 14(3) 2009, 129.