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Graphene-based Hall Sensors for direct magnetic imaging by using Scanning Hall Probe Microscope SELDA SONUSEN, Sabanci University, SEDA AKSOY, Istanbul Technical University, MUNIR DEDE, Nanomagnetics Inst., AHMET ORAL, Sabanci University — Graphene has been attracting great interest due to its unique electronic and mechanical properties for both fundamental and experimental studies since 2004. Graphene is a promising material for many applications in high speed electronic and spintronic devices as well as sensors. Its high mobility makes graphene a good candidate for magnetic imaging in Scanning Hall Probe Microscope (SHPM). Hall probes are used to scan the magnetic samples to image magnetic domains in SHPM. In this work, single layer graphene produced by chemical vapor deposition technique is used to fabricate Hall sensors by optical and the e-beam lithography with sizes from 500 nm to a few micrometers. The Hall crosses are characterized by Raman mapping to make sure that they are made of a single layer graphene. The Graphene Hall Sensors noise spectra is measured as a function of different bias currents and carrier concentrations at 300 K, 77 K and 4.24K. The imaging performance of the Hall sensor will be demonstrated at different temperatures by imaging a garnet crystal using a Low Temperature Scanning Hall Probe Microscope (LT-SHPM).

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