ON CHIP FABRICATION OF MAGNETIC DEVICES, ***Tejas Jhaveri***[1], *Cody Washburn*[1], *and Marie Yvanoff*[2], [1]*Department of Microelectronic Engineering,* [2], *Jayanti Venkataraman, Linda Meichle and Santosh K. Kurinec*[*], *Department of Electrical Engineering, tkj0540@rit.edu, skkemc@rit.edu*

The development of System-on-Chip (SOC) requires integration of discrete components on microchips. Micro magnetic components such as inductors are critical for RF SOC. Fabrication of micro inductors with high Q values at higher frequencies has been the limiting force for next generation wireless and micro-electro-mechanical (MEM) applications, as they require special magnetic cores. Research collaborations at RIT are developing a process that would enable the integration of ceramic magnetic materials on silicon substrates for a broad range of applications. In this study, application of electrophoretic deposition for depositing oxide magnetic material has been investigated. The magnetic material used for this study is a low coercivity soft spinel ferrite, manganese zinc ferrite ($Mn_xZn_{1-x}Fe_2O_4$) with initial permeability ranging from 5,000-10,000 for applications in micro inductors, micro transformers and other on chip magnetic devices. Micro/nano particles of sintered Mn-Zn ferrite have been prepared by jet milling technique followed by particle size reduction. EP deposition has been carried out from an isopropyl alcohol solution containing magnesium nitrate as the charging and binding agent. Device design, simulation and process development of on-chip spiral inductors with ferromagnetic core have been accomplished. Micro toroids and inductors have been fabricated on silicon substrates using conventional photolithography and deep silicon reactive ion etching (DRIE).