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**Dopant segregation and giant magnetoresistance in manganese-doped germanium** A.P. LI, Oak Ridge National Lab, C. ZENG, University of Tennessee, K. VAN BENTHEM, M.F. CHISHOLM, J. SHEN, Oak Ridge National Lab, S.V.S. NAGESWARA RAO, S.K. DIXIT, L.C. FELDMAN, Vanderbilt University, A.G. PETUKHOV, M. FOYGEL, South Dakota School of Mines and Technology, H.H. WEITERING, University of Tennessee — Dopant segregation in $Mn_xGe_{1-x}$ dilute magnetic semiconductor leads to a remarkable self-assembly of Mn-rich nanocolumns, embedded in a fully compensated Ge matrix. Samples grown at 80 $^\circ$C display a giant positive magnetoresistance that correlates directly with the distribution of magnetic impurities. Annealing at 200 $^\circ$C increases Mn substitution in the host matrix above the threshold for the insulator-metal transition, while maintaining the columnar morphology, and results in global ferromagnetism with conventional negative magnetoresistance. The qualitative features of magnetism and transport in this nanophase material are thus extremely sensitive to the precise location and distribution of the magnetic dopants.

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