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Rare-earth nitride films; Ion assisted growth. JOE TRODAHL, SIMON GRANVILLE, BEN RUCK, ANDREW PRESTON, Victoria University of Wellington, TONY BITTAR, GRANT WILLIAMS, Industrial Research Ltd. — We have recently reported a study of Gd nitride films grown by evaporating Gd in the presence of low-pressure N_2 gas. That work demonstrated that the material is a semiconductor in both the ambient-temperature paramagnetic and low-temperature ferromagnetic phases, with a conductivity determined by nitrogen vacancies. The present paper will report growth in a reactive environment that reduces the density of those vacancies. Films were grown by evaporating a number of rare earths by ion-assisted deposition (IAD), exploring films grown in ions with energies from 0 to 1000 eV. All of these IAD films show reduced crystallite size, expanded lattice constant, depressed magnetic ordering temperature and increased resistivity as compared to N_2-grown films. The optical band gap is largely unchanged by IAD.

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