Abstract Submitted for the MAR07 Meeting of The American Physical Society

Femtosecond time-resolved photoreflectance of InN thin films.¹ TSONG-RU TSAI, CHIH-FU CHANG, Institute of Optoelectronic Sciences, National Taiwan Ocean University, Keelung 202, Taiwan, Republic of China, S.-F. GWO, Department of Physics, National Tsing-Hua University, Hsinchu 300, Taiwan, Republic of China — The kinetics of the nonequilibrium photoexcited carriers in high-quality InN is investigated using femtosecond time-resolved pump-probe reflectivity measurements at room temperature. We observed that both of the hot-carriers relaxation times and carrier recombination times decrease with increasing photoexcited carrier density. We attribute the hot-carriers relaxation times anomaly is caused by the impact-ionization effect. And the carrier density-dependent recombination times can be explained by the Auger recombination (AR). The AR rate was found to have a quadratic rather than a cubic dependence on carrier density. The experimental results allowed the coefficients for impact-ionization, AR and a defect capture time in InN to be estimated as $2.3 \times 10^{-9} \text{cm}^3/\text{s}$, $2.5 \times 10^{-10} \text{cm}^3/\text{s}$ and 535 ps, respectively.

¹This work was supported by the National Science Council of R.O.C. under various grants.

Tsong-Ru Tsai Institute of Optoelectronic Sciences, National Taiwan Ocean University, Keelung 202, Taiwan, Republic of China

Date submitted: 04 Dec 2006 Electronic form version 1.4