improve the device performance due to donor injection. We demonstrate a fabrication method for extracting the emission from ZnO/GaN NTs only. We investigate carrier dynamics and quantum efficiency by Power and temperature dependent PL measurements (using CW 325 He-Cd laser) and time resolved PL spectroscopy (using femtosecond Ti:sapphire laser attached to a streak camera with a repetition rate of 76 MHz and a frequency tripled wavelength (266 nm)).

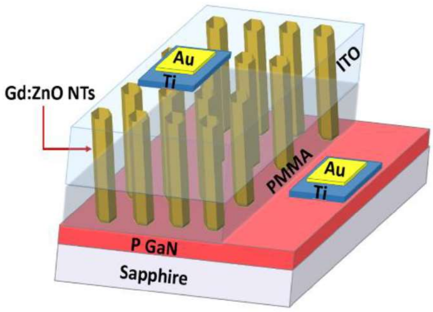

Fig1. The structure of n-GdZnO/p-GaN nanotube-based LED.

A09: Epitaxial yttrium iron garnet thin films for spin wave spectroscopy

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Yttrium iron garnet (YIG) is the best-known material for magnonics due to its extremely low magnetization precession damping. To realize this extraordinary low damping in YIG thin films, they must be epitaxial. For this purpose we used pulsed laser deposition (PLD) method. The YIG films were grown on monocrystalline (1 1 1) or (0 0 1) gadolinium gallium garnet substrates (GGG). The samples were deposited at high temperature (650 °C) under the 1.2×10^{-4} mbar oxygen pressure (8×10^{-8} mbar base pressure). Additionally, samples were annealed ex situ at 800 °C for 5 minutes. X-ray diffraction confirmed that the YIG film was single-phase epitaxial with the GGG substrate. Figure 1 (a)-(c) shows XRD θ–2θ scans with clear Laue oscillations, typical for highly epitaxial films (well textured YIG (1 1 1) and (0 0 1) film). Azimuthal angle scan shows that primitive cell of YIG has the same orientation as GGG primitive cell. YIG films on GGG (1 1 1) and (0 0 1) substrates are characterized by similar Gilbert damping of the order 5×10^{-4}, one order of magnitude lower than for metallic ferromagnetic thin films.

Thin films of YIG are commonly used in experiments with spin waves (SW). Figure 1 (d) shows the result of spin wave spectroscopy experiment with color coded spin wave spectrum characteristic of magnetostatic surface spin waves modes. In this experiment a spin wave is generated by a coplanar waveguide antenna, then propagates through a magnetic medium and finally is detected by another coplanar waveguide antenna. Using epitaxial YIG films as a magnetic medium it is possible to transmit spin waves for distance as long as 150 μm, much farther than for any typical metallic soft ferromagnetic material.

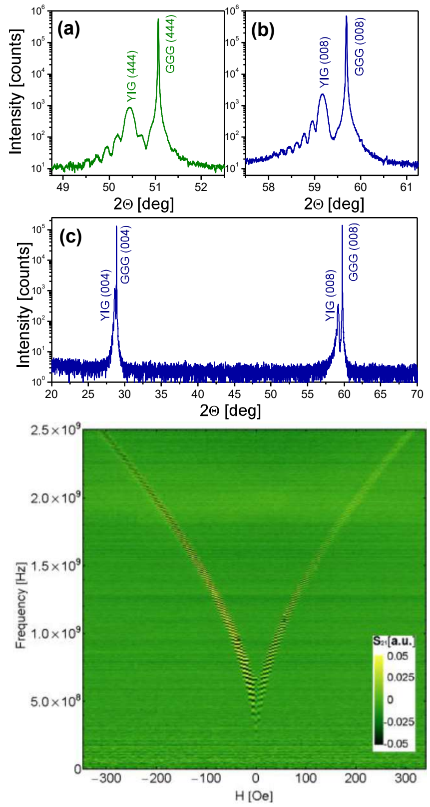

Fig1. (a) A XRD measurement (Bragg Brentano configuration) of epitaxial YIG film on GGG (1 1 1) substrate. (b) (c) A XRD measurement (Bragg Brentano configuration) of epitaxial YIG film on GGG (0 0 1) substrate. (d) SW transmission spectra (S_{21}) as a function of external magnetic field [1].

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A10: Proposal of a new concept processing for the next generation semiconductors —Design, Prototype and Process Characteristics of "Plasma Fusion CMP® Machine"

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CMP (Chemical Mechanical Polishing) is one of the most recognized and essential processing methods for making semiconductor material surfaces damage-free and planarized to atoms. Almost half a century ago original CMP principle was established, and over this period of time CMP technique has achieved remarkable progress contributing to the successful fabrication of Si semiconductors.

However, due to the theoretical limitation in Si semiconductors, new semiconductor materials such as SiC, GaN and diamonds are today attracting a great deal of attentions. Since these new materials are extremely hard to process, and chemically and thermally inert, resulting in a poor CMP removal rates when processed with the conventional CMP, a breakthrough has become essential for those next generation semiconductor materials, which has driven us to develop an innovative Plasma Fusion CMP®[1].

In simple terms, we have integrated a P-CVM (Plasma chemical vaporization machining) which is high efficiency plasma etching method using atmospheric