

고출력 레이저 펄스전송에 의한 광섬유 내의 결함연구
Defects in pure silica fibers induced by high power femtosecond laser pulse irradiation

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In order to investigate the damage caused by femtosecond (fs) laser irradiation, we have studied defects in the optical fibers by means of electron spin resonance (ESR) and other microscopic techniques. The central parts of silica-fiber were irradiated with several different powers using a Ti:sapphire fs (tp=110fs) laser having the wavelengths of 790 and 395nm through a microscope. During the irradiating the fiber, the plasma in the sample was generated and could be taken by photographs, and the refractive index of the laser irradiated part of the fiber was changed(Fig. 1). ESR signals of the produced defect in the samples turned out to be originating from the E' center and the defect concentration was found to be increased quadratically to the laser power. The relation between the refractive index and the defects in the irradiated fiber will be discussed.

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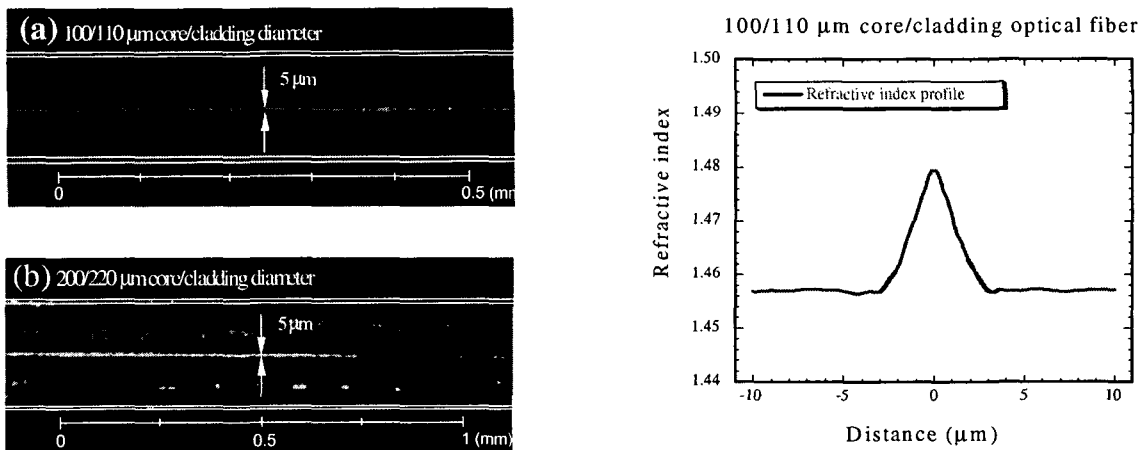


Fig. 1. Photographs of optical fibers with the diameter of 100 μ m(a) and 200 μ m(b) irradiated by a fs laser beam with the wavelength of 790nm, and the refractive index profile(c) for the sample (a).