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Characterization of self-phase modulation in liquid filled hollow core photonic band gap fibers: erratum

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In our paper devoted to the characterization of self-phase modulation in liquid filled hollow core photonic crystal fiber [J. Opt. Soc. Am. B **27**, 1886 (2010)], we deduced the nonlinear coefficient of the fiber from the experimental broadened spectra. From this value, we calculated the nonlinear index change of deuterated acetone filling the fiber, using additional measurement of the effective mode area of the fiber. We recently discovered that an error had been introduced in that evaluation of this effective area, which we will correct here. © 2013 Optical Society of America

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In our paper devoted to the characterization of self phase modulation in liquid filled hollow core photonic crystal fiber [1], we deduced the nonlinear coefficient γ of the fiber from the experimental broadened spectra. From this value, we calculated the nonlinear index change n_2^I of deuterated acetone filling the fiber using the relation $\gamma = 2\pi n_2^I / (\lambda A_{\text{eff}})$ and the additional measurement of the effective mode area of the fiber.

We recently discovered that an error had been introduced in that evaluation of the effective area. Indeed, we found that the CCD camera we used for imaging of the mode exiting the fiber (Fig. 5 of [1]), was set with a gamma correction factor of 0.45, giving a video signal proportional to $I^{0.45}$ and not proportional to the beam intensity I , as supposed in the paper. This means that the mode intensity radius w and the effective area $A_{\text{eff}} = \pi w^2$, determined in the paper, have to be multiplied by $\sqrt{0.45}$ and 0.45, respectively. We then really measure at $\lambda = 926$ nm, $w = 2.95 \pm 0.1$ μm , and $A_{\text{eff}} = 27.5 \pm 2.5$ μm^2 and at $\lambda = 951$ nm, $w = 2.8 \pm 0.1$ μm , and $A_{\text{eff}} = 24.7 \pm 2.5$ μm^2 .

The only consequence of this error is that we need to correct the determined value for the nonlinear index change n_2^I of deuterated acetone in the same proportion as the effective

Table 1. Nonlinear Coefficient and Nonlinear Index Change Calculated from Our Measurements at Different Wavelengths in the Liquid Filled Hollow Core Fiber

λ (nm)	A_{eff} (μm^2)	γ ($\text{W}^{-1} \text{km}^{-1}$)	n_2^I ($10^{-19} \text{m}^2 \text{W}^{-1}$)
926.8	27.5 ± 2.5	13.61 ± 0.40	0.55 ± 0.08
950.8	24.7 ± 2.5	13.01 ± 0.34	0.49 ± 0.07
957.5	24.7 ± 2.5	13.71 ± 0.87	0.51 ± 0.07

area: n_2^I having to be multiplied by 0.45. This means that Table 1 of [1] has to be changed.

The average value of n_2^I , determined from the self phase modulation data, is now equal to $0.52 \pm 0.08 \times 10^{-19} \text{m}^2 \text{W}^{-1}$, which is now 2 times higher than the n_2^I of silica.

REFERENCE

1. M. C. Phan Huy, A. Baron, S. Lebrun, R. Frey, and Ph. Delaye, "Characterization of self-phase modulation in liquid filled hollow core photonic band gap fibers," J. Opt. Soc. Am. B **27**, 1886–1893 (2010).