

New Functional Polymer Optical Fiber Technology (Min Park, Polymer Hybrids Research Center, Korea Institute of Science and Technology, P.O. Box 131, Cheongryang, Seoul 130 - 650, Korea)

1. POF

POF

POF	()	POF	()
			*		
	-		-	PMMA	
	-		-	PMMA	
			-		PMMA
			-		
			*		
			-		
					,
	-				
			*		
	-		-	POF	
				가	





2. POF

(Multi-core plastic optical fiber, MC POF) 가 POF 1 POF MC POF MC POF (coherent fiber)

가 .⁶ 1(a) (Step Index, SI) POF

. SI POF

()가 SI POF

가 POF

(155 Mbps) NA POF가 7 , NA POF가 (放射) 가 가 가 MC POF .⁸ 가 가



10 mm, 1 mm, 1 : 980 μm, 19 :180 μm, 217 : 55 μm).

. , NA가 . 2

POF

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13 2 2002 4

211

LED

NA MC POF가 LD 100 dB/km , MC POF POF SI POF 가 (MC POF). 가 , POF 3. 40~ (Large core POF, LC POF) 60% LC POF 100% 가 LC POF 가 3 mm Е *d*, (가) F d) r (Е LC POF 4 E가 가 Lumatec LC POF (2~8 mm, NA .9 0.61~0.73)가 가 , 가 , 가 가 4 LC POF spot spot () light guide 10 가 . 300 W Xenon 'light engine' GE light powermeter guide .11 5 m LC POF SI 25% 가 NA가 LC POF , 5 m 70% , light guide 100 LC POF

NA

dB/km

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10 m , 가 , 13 - 15 . 가 LC POF . ,

.16 LC POF , 가 , . 가 가 POF

POF

POF 4. POF POF (旋光) POF POF

(gain) POF .17 POF POF () , POF POF 가 2 mm ×2 mm, 23 mm PMMA 50 ms .18 가 -a-(Poly - *a* methylstyrene, PαMS) 1.5 mm, 7 cm POF 가 가 .¹⁹ 1.5 kV 2 가 wt%

POF POF

POF

가

)

POF

(POF

POF , POF

optoelectronics

가 . POF

가

POF , POF

POF POF 20,21 . POF

・ μm PMMA POF フト 1 s POF .²²

7 5 (a) -Rhodamine (Rh6G) Thymol Blue (TB) 7 POF POF POF . 7 7 7 7 7









가 가 POF .

5. POF

POF (Polymer Optical Fiber Amplifier, POFA) POF 7 POF . (compatibility) , 7 , 24 POF 7 .

(Erbium) 가 가 5 10 µm , 가 1.5 µm POF . 가



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6. POFA (, R:Rhodamine, SB: Sulforhodamine B, S101: Sulforhodamine 101).



mine B).







- 1. 并手 文雄, "Optoelectronics and Polymers", p. 2, 共立出版, 1995.
- 2. 井手 文雄, "實用高分子材料", p. 179, 工業調査會, 2002.
- 3. Gatekeeper社, POF World 2000, Tutorial #1, POF Industry Overview, 2000.
- 4. , , , , , 3(5), 27 (2000).
- 5. , " ", 2000.
- 6. 豊島, *高分子*, 45, 98 (1996).

- http://www.pofeska.com/pofeskae/pofe/meg ae/megae.htm.
- 8. H. Munekuni *et al.*, *Proc. Of POF & Applications Conf.*, 148 (1994).
- 9. Lumatec社 , http://www.lumatec.de/E_Ligh tgds/ ghtgdsE.htm.
- 10. M. Ishiharada et al., POF' 93 Haag (1993).
- 11. G. E lighting, Photonics Spectra, 11, 16 (1990).
- 12. Asahi Kasei
- 13. 內田憲男, 鐵道電氣, 2, 44 (1996).
- 14. 積水樹脂社
- 15. M. Ishiharada et al., IRC 95 Kobe Preprints (1995).
- 16. 烏又榮治, *計測自動肺御學會論文集*, 30, 1402 (1994).
- 17. Y. Koike Ed., "Plastic Optical Fiber, POF Consortium", 共立出版社, 1997.

- 高橋英郎 et al., *纖維學會第3回 Optics & Electronics 有 機材料 Symposium*, 1 (1986).
- 19. 武藤眞三, *高分子*, 45(2), 94 (1996).
- 20. S. Muto *et al.*, Jpn. J. Appl. Phy., 31(3B), L346 (1992).
- 21. S. Muto et al., Optical Review, 3(2), 120 (1996).
- 22. S. Muto *et al.*, Jpn. J. Appl. Phy., 33(10), 569 (1994).
- 23. A. B. Wojcik et al., Proc. SPIE. Sol-Gel Optics III, 2288, 392 (1994).
- 24. 中澤正隆, 應用物理, 59(9), 1175 (1990).
- 25. A. Tagaya et al., Appl. Phys. Lett., 63, 883 (1993).
- 26. A. Tagaya et al., Appl. Opt., 34, 988 (1995).