

Performance and Fabrication of Optical Connectors for Singlemode Optical Fibers

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This thesis describes an apparatus for forming an angled convex surface at the ferrule endface in order to fabricate a highly stable APC connector(angled physical contact connector), and also describes a theoretical analysis of APC connectors to improve an insertion loss for a pair of mated APC connectors with a slanted angle of 8 to 12 degrees for singlemode optical fibers.

A new polishing method and an apparatus for forming an angled convex surface at the ferrule endface have been described. The new apparatus polishes the ferrule endface utilizing an elastic polishing plate performing orbital and rotational motion. Based on experimental studies, conditions for forming the angled convex surface on the polished optical fiber endface have been decided using this new polishing apparatus, and the optical performance of the convex surface on the polished optical fiber endface has been compared with the theoretical analysis.

Compatibility among the APC connectors has experimentally and theoretically confirmed on the new type of stepped-ferrules and new type of connector components which have been developed by the author.