

Principles of Optical Fiber

Optical fiber transmits light. But, what prevents the light from escaping from the fiber?

The answer is based on a principle that we experience every day.

While swimming at the beach as a child, did you ever think you were safely in shallow water only to be surprised to find that it was too deep to touch the bottom? When you look straight down into a clear lake or puddle, you can see its bottom. However, when you view it at an angle and look off into the distance, the distant scenery is reflected upside down. This is caused by the difference in the index of refraction between the water and air.

Although optical fiber appears to be only a simple thread, it is actually composed of two structures similar to water and air. The area where light is transmitted is called the core, and the external area is called the cladding.

When light enters the area between two materials with different indices of refraction (boundary face), the light will be either entirely reflected or a portion of it will be refracted, depending on the angle. If the light can be kept at an angle where it is entirely reflected, it will become trapped inside and be transmitted along the length of the fiber.

