

## عنوان مقاله:

The refractive index sensor of the SMF covered by nanodiamond layer

## محل انتشار:

مجله بین المللی ابعاد نانو، دوره 13، شماره 1 (سال: 1401)

تعداد صفحات اصل مقاله: 9

## نویسندگان:

Marzieh Naddafan - *Department of Physics, Faculty of Science, Shahid Rajaei Teacher Training University, Tehran, P. O. Box 16788-15811, I. R. Iran*

Javid Zamir Anvari - *Department of Physics, Faculty of Science, Shahid Rajaei Teacher Training University, Tehran, P. O. Box 16788-15811, I. R. Iran*

Azadeh Ahmadian - *Department of Physics, Faculty of Science, Tarbiat Modares University, Tehran, P. O. Box 14115-175, I. R. Iran*

Zahra Reyhani Clor - *Department of Physics, Faculty of Science, Shahid Rajaei Teacher Training University, Tehran, P. O. Box 16788-15811, I. R. Iran*

## خلاصه مقاله:

This study evaluated the light transmission characteristics of a single modular fiber with a cylindrical microchannel using the FDTD method. To this end, various microchannel diameters (4-11 $\mu\text{m}$ ) were explored. The SMF included a silica core ( $n=1.4$ ) coated by a nanodiamond layer with a refractive index of 2.42. The impact of Fabry-Perot resonance was evidently detected in transmission features. At constant , the light transmission variations depended on the refractive index of the microchannel. A significant change was observed in the upon altering the microchannel refractive index. Based on the results, a microchannel-based SMF with different diameters can be employed for refractive index sensing. In the cases where the diameter of the microchannel largely differs from that of the core ( $\lambda\mu\text{m}$ ), the transmission variations were negligible. The numerical results are in good agreement with those reported in the microhole or microchannel experiment. The highest and lowest transmissions were recorded for the microchannel at diameters of 4 and 11 $\mu\text{m}$ , respectively. Comparing related experimental and numerical results show proper control of the microchannel diameter can enhance light transmission through the core-microchannel. The sensitivity of the refractive index to the microchannel diameter is a promising feature that can be exploited for developing various fiber optical devices

## کلمات کلیدی:

FDTD, Fiber Optics, Nanodiamond, Refractive index, Sensors, Transmission

## لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1455138>



