

عنوان مقاله:

Developing the Plasmonic Fractal Nanoantenna for Energy Harvesting and Biosensing Application

محل انتشار:

فصلنامه پردازش سیگنال و انرژیهای تجدیدپذیر، دوره 6، شماره 4 (سال: 1401)

تعداد صفحات اصل مقاله: 12

نویسندگان:

Sepideh Ebrahimi - Department of Electrical Engineering, Aligudarz Branch, Islamic Azad University, Aligudarz, Iran

Ferdows Zarrabi - Department of Engineering, Science and Research Branch, Islamic Azad University, Tehran, Iran

خلاصه مقاله:

In this paper, a Plasmonic arc-shaped nanoantenna is modeled and developed for light trapping and energy enhancement with the multi-Fano response for the mid-infrared spectra in the range of $2000\text{--}6000\ \mu\text{m}$. A symmetric model is suggested to achieve Fano line-shapes and make a hot spot to increase the electric field intensity. Fano response is gained by adding inner parasitic arc elements to the primary Plasmonic ring antenna. Then, the triple jounced ring structure is utilized to improve the electric field intensity. The final nanoantenna depicts that we can improve the electric field with this current nanoantenna with multi-Fano characteristics in comparison to the single Fano response. The maximum electric field efficiency is obtained $45\cdot$ times which shows more than $30\cdot\%$ enhancement in comparison to a simple ring nanoantenna. The efficiency of $65\cdot$ times obtained with slant polarization. The sensitivity of the external biological material is checked for the single and multi-Fano elements. The maximum value of sensitivity for the final nanoantenna is $148\ \text{nm}/\text{RIU}$. The multi-Fano has advantages for trapping energy in wider bandwidth and limiting the energy losses in the Plasmonic and Fano resonance

کلمات کلیدی:

Biosensing, Energy harvesting, Fano, Heptamers, Plasmonic

لینک ثابت مقاله در پایگاه سیویلیکا:

<https://civilica.com/doc/1727335>

