


Студенттер мен жас ғалымдардың

«ФАРАБИ ӘЛЕМІ»

атты халықаралық ғылыми конференциясы

Алматы, Қазақстан, 2019 жыл, 8-11 сәуір

Международная научная конференция
студентов и молодых ученых

«ФАРАБИ ӘЛЕМІ»

Алматы, Казахстан, 8-11 апреля 2019 года

International Scientific Conference of
Students and Young Scientists

«FARABI ALEMI»

Almaty, Kazakhstan, April 8-11, 2019

NEW SOLID PHASE MICROEXTRACTION FIBER BASED ON METAL ORGANIC FRAMEWORK FOR ANALYSIS OF VOLATILE ORGANIC COMPOUNDS

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New solid phase microextraction (SPME) fibers based on metal-organic frameworks (MOF) can solve existing commercial fiber disadvantages: high cost and brittleness, limited thermal stability and selectivity. MOF are crystalline three-dimensional coordination polymers. The structure of the MOF includes metal centers (metal ions or a group of metal ions) associated with organic linkers by coordination bonds. MOF have permanent porosity and high surface area; thermal (200-400°C) and mechanical stability, homogeneous structured nanoscale pores, the possibility of modification of the shape and size and high adsorption affinity [1,2].

The objective of this work was to obtain new SPME fiber coating based on MOF-199. Synthesis and deposition of MOF-199 on stainless steel core were carried out by *in situ* solvothermal method. Optimized parameter of MOF-199 synthesis included reaction time (16 h), type of reaction solvent (ethanol, 95%) and solvents for core etching (1:1 HF water solution).

Obtained 30-μm MOF-199 SPME fiber was tested for extraction of 25 volatile organic compounds (VOCs) from air with concentration of each analyte C_g=100 μg/m^3. Results of extraction were compared with commercial available SPME fiber – 65-μm polydimethylsiloxane/divynilbenzene (PDMS/DVB). Extraction effectiveness for 15 VOCs from studied 25 VOCs obtained by MOF-199 based SPME fiber were 2-12 times higher than that by 65-μm PDMS/DVB fiber.

Acknowledgement: The research was funded by the Ministry of Education and Science of the Republic of Kazakhstan (grant number AP05133158).

References

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