

## Synthesis of magnetosensitive nanocomposites with carbon surface

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Carbon sorption materials are widely used to solve various problems in engineering, biotechnology, medicine, environmental protection, *etc.*

The aim of this work is to synthesize new magnetosensitive nanostructures with single-domain magnetite-based carbon surface and research their properties.

The carbonization of the surface was realized with organic substance – reagent grade glucose.

To determine the optimal conditions of the carbonization of the magnetite surface was investigated the influence of glucose concentration, pressure, temperature and time of carbonization, the specific surface and methylene blue (MB) adsorption characteristics.

**Table.** Characteristics of MB adsorption on the Fe<sub>3</sub>O<sub>4</sub>/C nanocomposite

Conditions of synthesis	A, mg/g	R, %	Conditions of synthesis	A, mg/g	R, %
Influence of glucose (gl.) concentration			Influence of pressure		
0.15 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C	0.65	37	0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> 1 atm, 180 °C	1.4	68
0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C	2.9	100	0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 2,5 atm, 180 °C	2.2	74
0.45 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C	3.2	100	0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C	2.9	100
0.65 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C	2.3	74	0.33 g of gl./1r Fe <sub>3</sub> O <sub>4</sub> , 7,5 atm, 180 °C	2.0	87
Influence of temperature and time of carbonization					
0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 180 °C, 6 h	2.9	100	0.33 g of gl./1 g Fe <sub>3</sub> O <sub>4</sub> , 5 atm, 300 °C, 3 h	1.1	70

The optimal conditions of the carbonization of magnetite is: glucose concentration is 0.3-0.5 g per 1 g of magnetite,  $P = 5$  atm,  $T = 180^{\circ}\text{C}$  during 6 h.

The synthesized nanocomposite is prospective for creation of new magnetosensitive sorbents for medical-biological, technical and ecological purposes.