For the first time graphene structures are obtained by reactive magnetron sputtering with the graphite cathode in vapors of one of the representatives of the wide class of aromatic hydrocarbons – naphthalene. The carbon grid of the molecular structure of aromatic hydrocarbons coincides with the graphene of the carbon grid. The paper presents the technique of obtaining graphene and results of investigations of its structural peculiarities by methods of Raman light scattering spectroscopy, electron paramagnetic resonance, and atomic force microscopy. Graphene peaks with the vibrational mode (2D-zone) at a frequency of ~2728 cm–1 are identified by the method of Raman spectroscopy. Results of investigations by the method of atomic force microscopy confirm the formation of graphene sheets and carbon nanotubes. Results of investigations are presented and discussed.