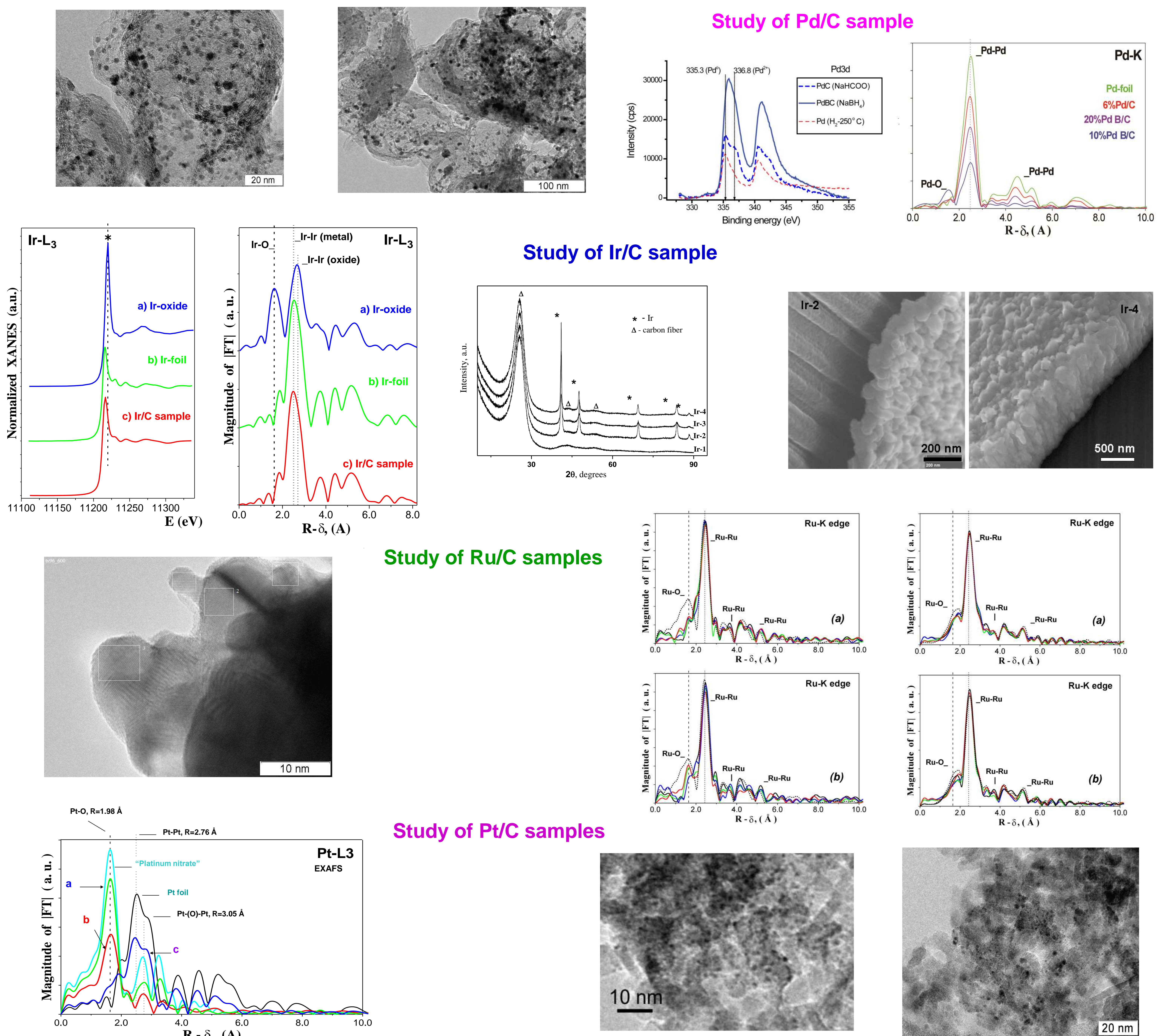


# Determination of the state of the active component of nanocomposite model metal-carbon catalysts by XAFS method

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This work presents the results of a study of the genesis of nanosize forms of precious metals - Pt, Pd, Ru and others, existing in mono- and bimetallic supported catalysts, stabilized on the oxide and carbon supports of different nature by XANES/EXAFS spectroscopy. It is well known that nanosize forms of noble metals exhibit a high catalytic activity in various industrial important processes and also ones are promising for applications of alternative energy. Development of methods of synthesis can provide to a significant economical profit, due to lower metal content in the active component and optimization of the catalytic properties. Detailed study of the nature of different stabilization forms of the supported metal, it is necessary to create new effective catalysts for various industrial applications. Samples of supported catalysts were prepared under varying preparation methods (zol-gel, impregnation, deposition-precipitation) from different precursors. All XANES/EXAFS spectra of the Pt-L3, Ir-L3, Pd-K, Ru-K edges were recorded at Siberian Synchrotron and Terahertz Radiation Center (SSTRC, Novosibirsk).



The study of the genesis of the active component of the local structure, including the study of initial precursors and catalysts after reduction and change the state of the active component were carried out. It was shown that, depending on the prehistory, the formation of different (metals, metal-oxides, oxides) nanosize forms of precious metals, which are located on the surface of the supports. The interatomic distances and corresponded coordination numbers were established. All possible structural models were discussed. Additionally, the samples of catalysts were characterized by the TEM, EDX, XRD, XPS methods. The data obtained by all the methods are in a good agreement.

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