عنوان مقاله:

Synthesis and characterization of a new Ruthenium complex based on various supports; investigation of electrocatalytic properties of prepared complex and nanocomposites in reduction of CO2 to CO

محل انتشار:

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خلاصه مقاله:

The current energy supply of human society is mainly based on fossil fuels like coal, oil and gas which are related to several problems. The reserves are decreasing and their final depletion seems to be just a matter of time. In addition, the combustion of fossil fuels leads to the emission of CO2, which is considered as a main source for global warming caused by the greenhouse effect [1]. The demand for energy is steadily increasing. Renewable energy appears to be the only sustainable solution. However, since the availability from renewable sources such as wind and solar energy are variable and often do not meet with the time and local needs, efficient energy storage and transport are also critical issues. Therefore recycling of carbon dioxide by catalytic conversion to gaseous or liquid fuels using renewable energy has received increasing interest in the past years [2].Up to now, mainly ruthenium-based systems have been reported for their ability to electrochemically or photochemically accelerate the reduction of CO2 to CO. Carbon monoxide itself can be used as a precursor compound for fuel synthesis processes, where CO and H2 are mixed as syn-gas to form hydrocarbons such as methane or methanol by fischer- tropsch process[1,2].Here, we report the synthesis and structural characterization of a new mononuclear polypyridyl Ru(II) complex, [Ru(tptz)(ACN)Cl2] (where tptz = 2,4,6-tris(2-pyridyl)-1,3,5-triazine and ACN = Acetonitrile). The electrocatalytic reduction of CO2 to CO by the complex was investigated using cyclic voltammetry (CV) in CH3CN solution. Ruthenium complex/various supports nanocomposites prepared and the effect of support on the electrocatalytic performance of prepared nanocomposite investigated. The electrocatalytic activity of products investigated by circle voltammetry. We utilized density functional theory (DFT) to investigate a potential pathway and reaction mechanism of CO2 reduction in a catalytic cycle.

کلمات کلیدی:

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