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Oxygen reduction reaction in fuel cells: influence of the carbon support¹ CECILE MALARDIER-JUGROOT, MICHAEL GROVES, MANISH JUGROOT, Royal Military College of Canada — In fuel cell technology, the development of efficient catalysts and method for catalyst deposition is crucial. Indeed, the efficiency of the catalyst will control the kinetics of the reaction by decreasing the activation energy. The oxygen reduction reaction (ORR) on the cathode reaction is a slow reaction and limits the efficiency of the system. In addition, a catalyst widely used in fuel cell applications is platinum (Pt), which is responsible for the cost of the fuel cell system. We have previously shown that inserting dopants in the carbon support of the catalyst significantly increase the durability and efficiency of the catalyst. In this paper we will present a detailed study of the different steps of ORR using Density Functional Theory and will describe the influence of dopants inserted in the carbon support on the different steps of the reaction. We will also provide insights on the role of water on the thermodynamics of the reaction.

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