Short Communication

Metal-free Electrocatalyst for Hydrogen Production from Water

A.V. Dolganov^{1,*}, B.S. Tanaseichuk¹, P.M. Ivantsova², Y.V. Tsebulaeva¹, S.G. Kostrukov¹,
D.N. Moiseeva¹, N.M. Shmelkova¹, V.Y. Yurova¹, O.I. Balakireva¹, N. N. Trushkova¹, I.G. Nagaeva¹.

¹ Department of Chemistry, Mordovian Ogarev State University, Saransk 430005,
Russia

² Department of Chemistry, M.V. Lomonosov Moscow State University, Leninskie Gory 1/3, Moscow,
Russian Federation

*E-mail: dolganov_sasha@mail.ru

doi: 10.20964/2016.11.24

Received: 8 August 2016 / Accepted: 31 August 2016 / Published: 10 October 2016

Here we report organic metal-free catalyst – 9-phenyl-10-methylacridinium iodide (PhAcrI) for hydrogen evolution reaction (HER) from water at pH from 1 to 4. With increasing pH to 7 HER, according to the GA analysis of the HER is not observed. The catalytic nature of the reduction wave PhAcr⁺/PhAcr[•] was confirmed by controlled potential electrolysis experiments with a simultaneous quantitative detection of hydrogen evolved. PhAcrI at low pH reacts via protonation of an PhAcr[•]-intermediate that subsequently forms H₂ via a homolytic mechanism.

Keywords: HER, Metal-free electrocatalyst, aqueous solution, 9-phenyl-10-methylacridinium iodide

[FULL TEXT](#)

© 2016 The Authors. Published by ESG (www.electrochemsci.org). This article is an open access article distributed under the terms and conditions of the Creative Commons Attribution license (<http://creativecommons.org/licenses/by/4.0/>).