PLATHINIUM
PLASMA THIN FILM INTERNATIONAL UNION MEETING
13-17 September 2021
WWW.PLATHINIUM.COM
VIRTUAL MEETING

#PLATH00159

PROC / Process control (including plasma diagnostics, plasma modelling)

NO_x emissions intrinsic to water/gas hybrid DC arc plasma torch at different power levels and gas flow rates

R. Tomar[2,3,4], N. Kumar[1], , V.S. Sikarwar[5], A. Mašláni[5], M. Jeremias[5], M. Pohorely[6]
[1] *Univ. West Bohemia, Pilsen (CZ)*
[2] *Institute of Plasma Physics, Czech Academy of Sciences, Pilsen (CZ)*
[3] *ORLEN Unipetrol Centre for Research and Education, Litvínov-Záluží (CZ)*
[4] *Univ. Chemistry and Technology, Prague (CZ)*
[5] *Institute of Plasma Physics, Czech Academy of Sciences, Prague (CZ)*
[6] *Department of Power Engineering, Univ. Chemistry and Technology, Prague (CZ)*

Abstract content

Water Hybrid plasma torches are used in a wide range of industrial applications, such as plasma spraying, spheroidization, inflight chemical synthesis, and the pyrolytic treatment of waste materials. When such applications require water hybrid plasma torches to be operated at temperatures above 2500 K, significant quantities of nitrogen oxides (NO_x) are produced. The main goal of the project is to investigate NO_x emissions from the external plasma jet of a water hybrid plasma torch at power levels (14, 16, 20, 26 kW) and gas flow rates (12, 18, 25 slpm) which are typically used in industry. A calibrated thermochemical NO_x analyzer will be used to remotely monitor NO_x concentrations in the plasma jet. Together with additional thermochemical and CFD simulations, the obtained results will lead to a number of conclusions concerning the control of NO_x emissions and can be used to ensure that the final NO_x gases released into the atmosphere from a water hybrid plasma torch remain within regulatory limits.