Oxy-fuel combustion is considered as a promising solution to reduce greenhouse-gases and pollutant emissions. The main advantage of oxy-fuel combustion over other technologies for pollution reduction from pulverized coal combustion is that it can be applied to the existing coal-fired power plants. However, switching from conventional to oxy-fired coal combustion brings significant challenges. One of the most important is change of pulverized coal ignition characteristics. This paper presents the results of experimental and numerical analysis of ignition phenomena under oxy-fuel conditions. The main focus of the presented paper is to evaluate the effectiveness of the mathematical devolatilisation sub-model, in predicting the ignition point of pulverized coal flames under oxy-firing conditions. Regarding this, the performance of several devolatilisation models, from simple to more complex ones, in predicting ignition point position have been investigated. Numerically determined values of the ignition point position, and ignition temperature for various O-2/N-2 and O-2/CO2 conditions were compared with experimental data from the laboratory ignition test facility. Obtained results pointed out that network devolatilisation models (CPD and FG) give more accurate results in comparison with standard devolatilisation models (single rate and two competing rates). The best
performance is achieved using FG devolatilisation model. Thus, newly implemented FG model will be used for future numerical simulations of oxy-fuel pulverized coal combustion on 0.5 MW pilot plant facility. (C) 2011 Elsevier Ltd. All rights reserved.