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**Ignition Delay Time and OH Concentration Measurements in Nanosecond Repetitively Pulsed Hydrogen-Air Plasmas** IGOR ADAMOVICH, ZHIYAO YIN, INCHUL CHOI, WALTER LEMPERT, The Ohio State University — Ignition delay time and OH concentrations are measured in a spatially uniform, repetitive nanosecond pulse discharge in premixed hydrogen-air flows. Ignition delay is measured in hydrogen-air flows preheated in a tube furnace, at initial temperatures of T=100-200 C (significantly below autoignition temperature), in a wide range of pressures (40-150 torr), equivalence ratios (0.5-1.2), and discharge pulse repetition rates (10-40 kHz). The results show that the plasma remains uniform in the entire range of experimental conditions, and that uniform ignition occurs in the entire plasma volume. The number of discharge pulses necessary for ignition decreases considerably as the pressure and the initial temperature are increased. Ignition delay time remains nearly independent of the equivalence ratio. Time-resolved, absolute OH concentrations in hydrogen-air mixtures, initially at room temperature, excited by the nanosecond pulse discharge are measured by Laser Induced Fluorescence, using adiabatic Hencken burner flame for calibration. OH concentrations are measured both in single-pulse and in repetitively pulsed discharges. The results demonstrate OH accumulation in the repetitively pulsed plasma until ignition occurs due to plasma chemical reactions.

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