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Atmospheric pressure pulsed discharge plasma using slug flow systems in glass column and its application for dye degradation MOTOKI YAMADA, WAHYU DIONO, HIDEKI KANDA, MOTONOBU GOTO, Nagoya University — Non-equilibrium pulsed discharge plasma using a gas/liquid slug flow in glass column is applied to waste water treatment containing Methylene Blue (MB). The reactor was comprised of 4 rows glass column bundled by copper foils that attached on the outside surface of the column. Also, the foils were used as high-voltage electrodes totally in 5 parallels. As the ground electrodes, copper foils were attached on the column at distant of 25 mm from high-voltage electrodes in the same way. By flowing the solution and gas simultaneously in the slug flow system, the interval of produced bubbles could be controlled and adjusted each flow rate. After the slug flow became steady, an electrical discharge was introduced into the system by using AC power supply with a bipolar pulsed output voltage, generating plasma in bubbles between electrodes. The output voltage is 9kV at 10 kHz repetition. The reaction was conducted totally in 120 min, and the degradation ratio was measured every 20 minute. As a result, over 90% of MB were degraded in all of the gas species (oxygen, argon, and helium). Especially in the case of oxygen, mostly all of the MB were degraded within 120 min. This implies that many kinds of active species originated from oxygen plasma worked effectively.

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