

Abstract Submitted  
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**Ignition mechanism of mercury-free HID lamps for automotive headlamps** TADAO UETSUKI, TAKAO SHIMADA, RYOTA YAMAMOTO, KOTARO SHIMIZU, Tsuyama National college of Technology, MASAYA SHIDO, YUKIO ONODA, Koito Manufacturing Co., Ltd. — It is important to decrease the ignition voltage of the mercury-free HID lamp for automotive headlamp in order to make their ballast smaller. We think it is necessary to understand how the discharge starts and grow in the HID lamp burner in order to decrease the ignition voltage. An ultra high speed camera was used for the observations of the discharge, the shutter speed of which is 5n seconds. As the result, we found the discharge grow through three stages. First, a very weak discharge occurs outside the burner. Second, the very weak plasma was formed near the cathode in the burner, and then it grew toward the anode. Finally, a strong discharge like streamer developed from the anode to the cathode. The weak plasma seems to be made by the strong electric field formed by the attached electric charge on the outside of the burner wall, which was formed by the first weak discharge that occurred outside of the burner. In this study we discuss these observations.

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