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FTIR characterization of the gas phase chemistry in pulsed 1,3-butadiene discharges in a Gaseous Electronics Conference (GEC) Cell
ASHISH JINDAL, LAWRENCE OVERZET, MATTHEW GOECKNER, The University of Texas at Dallas — FTIR Spectroscopy is used to characterize the gas phase chemistry of various pulsed regimes in a 1,3-butadiene ($\text{H}_2\text{C}=\text{CHCH}=\text{CH}_2$) discharge in an inductively coupled GEC reactor. Characterization is done as a function of the plasma on to off time at both constant and varying duty cycles. The power delivered during the on time is adjusted such that the time averaged power for all runs is maintained at a constant 10 W (13.56 MHz). The dissociation mechanisms for the observed chemical densities are investigated. For example, it appears that only the π bond of the C=C bond is cleaved for the shorter on times. At longer on times the remaining σ bond is also broken and a sizable fraction of the gas becomes free CH_2 . This bond destruction has a profound impact on film growth and thus a link between the gas and surface phase processes will also be examined.

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