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***in situ* Electron Spin Resonance Study for Plasma-Surface interactions** KENJI ISHIKAWA, Nagoya University, N. SUMI, A. KONO, H. HORIBE, Kanazawa Institute of Technology, K. TAKEDA, H. KONDO, M. SEKINE, M. HORI, Nagoya University — Using an *in situ* electron-spin-resonance (ESR) technique, dangling bond creation processes were studied. To understand both gaseous reactive species and surface reaction mechanism on the surface, creation of radicals is indeed a key process. In this study, we studied the real defect state on the surface during plasma processes. An ESR system was connected with plasma discharge tube. Both gaseous and surface radicals can be detected *in situ* simultaneously. For instance, on fluorocarbon polymer, carbon dangling bonds were created by exposure of hydrogen atom (detected by ESR) transported through glass tube at down-flow of plasma. Those signals were assigned CF_2-*CF-CF_2 (hyperfine interaction of 91 and 34 G). As demonstrated, the *in situ* ESR technique provides a new experimental approach to the microscopic understanding of chemical reactions on surfaces with gaseous radicals during plasma processes.

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