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Network structural analysis using directed graph for chemical reaction analysis in weakly-ionized plasmas KYOSUKE NOBUTO, YASUTAKA MIZUI, SHIGEYUKI MIYAGI, OSAMU SAKAI, The University of Shiga Prefecture, TOMOYUKI MURAKAMI, Seikei University — We visualize complicated chemical reaction systems in weakly-ionized plasmas by analysing network structure for chemical processes, and calculate some indexes by assuming interspecies relationships to be a network to clarify them. With the current social evolution, the mean size of general data which we can use in computers grows huge, and significance of the data analysis increases. The methods of the network analysis which we focus on in this study do not depend on a specific analysis target, but the field where it has been already applied is still limited. In this study, we analyse chemical reaction systems in plasmas for configuring the network structure. We visualize them by expressing a reaction system in a specific plasma by a directed graph and examine the indexes and the relations with the characteristic of the species in the reaction system. For example, in the methane plasma network, the centrality index reveals importance of CH_3 in an influential position of species in the reaction [1]. In addition, silane and atmospheric pressure plasmas can be also visualized in reaction networks, suggesting other characteristics in the centrality indexes. [1] O. Sakai, K. Nobuto, S. Miyagi and K. Tachibana, AIP Advances **5**, 107140 (2015).

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