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Changes in hydrophilicity and surface morphology of polytetrafluoroethylene by 1 keV Ar and H ion irradiation in reactive gas(N₂, NH₃) environment

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Surface of polytetrafluoroethylene (PTFE) was modified by Ar and H₂ ion with reactive gas (N₂, NH₃) environments. In this study, the ion dose was changed from 1×10^{15} to 1×10^{17} ions/cm² at ion energy of 1 keV. In order to investigate the effect of ion species and environmental gas on the hydrophilicity and morphology of PTFE, the modified specimens were characterized using the contact anglemeter and SEM. The water contact angle(WCA) on raw PTFE surface is 104 ° and the WCA of modified PTFE was varied from 35 ° to 140 ° with ion species and environmental conditions. From this result, it is shown that the hydrophilicity of modified PTFE surface is affected by ion species for irradiation, and is closely related to the morphology as well as chemical state of PTFE. Effects of Ar and H₂ ion in N₂ and NH₃ environments on the morphological changes would be explained in terms of the physical and chemical phenomenon on the surface induced by ion irradiation. In addition, it would be suggested that the optimization of ion species and environmental conditions could control the surface morphology of PTFE.)