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Interpretation of dynamic mechanical and fibrillation behaviors of LCP/PET blended droplets by repeated extrusion

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LCP(Liquid Crystal Polymer) is a high strength polymer which shows characteristics that are the rigid main chain and molecule's arrangement which has directivity. If nanofiber is manufactured depending on LCP, there is every possibility of utilizing in a higher value-added industry. Although there are some processes to produce nano fiber such as electricity spinning and sea-island type, it still has difficulties that electricity spinning has a low output and sea-island type is restricted to reduce fiber diameter. It will be effective to solve the existing problems as mentioned above that if material of droplet shape is able to become consecutive fiber morphology through stretching process. The research that deal with making continuity through the way to regulate size of droplet has not yet been achieved in existing dissertations of manufacturing of fibers related to droplet stretching method. This study is planned to verify control of droplet via study of its behaviors that are influenced by repetitive extrude LCP and PET blend substance and confirms size changes of droplet while it is extrude repeatedly. These changes show size growth according to increase number of extrusion and changes of droplet's location are checked as well. Distribution of droplets was observed to LCP and PET blending process for conjugate spinning. In this process, cutting the extruded samples were conducted two repeated extrusion to see the changes at once again repeat the process of extrusion. Droplets were distributed relatively evenly in the initial extrusion process. But the secondary and third the size of the droplet was increased and the phenomenon was founded that the droplet was gathered in the center. This phenomenon was assumed that the miscibility of LCP/PET and the flow characteristics correlate with the phenomenon, so conducted the analysis. In this study, to analyze distribution and component of droplet was conducted. Also miscibility of LCP/PET was analyzed and fibrillation of droplet was confirmed through the experimental relevance.

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