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Spontaneous water filtration of bio-inspired membrane[1] KIWOONG KIM, HYEJEONG KIM, SANG JOON LEE, Pohang Univ of Sci Tech — Water is one of the most important elements for plants, because it is essential for various metabolic activities. Thus, water management systems of vascular plants, such as water collection and water filtration have been optimized through a long history. In this view point, bio-inspired technologies can be developed by mimicking the nature's strategies for the survival of the fittest. However, most of the underlying biophysical features of the optimized water management systems remain unsolved In this study, the biophysical characteristics of water filtration phenomena in the roots of mangrove are experimentally investigated. To understand water-filtration features of the mangrove, the morphological structures of its roots are analyzed. The electrokinetic properties of the root surface are also examined. Based on the quantitatively analyzed information, filtration of sodium ions in the roots are visualized. Motivated by this mechanism, spontaneous desalination mechanism in the root of mangrove is proposed by combining the electrokinetics and hydrodynamic transportation of ions. This study would be helpful for understanding the water-filtration mechanism of the roots of mangrove and developing a new bio-inspired desalination technology.

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