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Zero-Energy Mechanoluminescent Platform with Quantum Dots and Elastic Polymer Matrix

Mechanoluminescence (ML) is a unique phenomenon where materials emit light under mechanical forces like pressure, friction, or bending. This is different from traditional light-emitting devices that need electric energy supply for operation. The ML has gained significant attention as a promising technology for various applications, including pressure-sensitive light emission sensors, wind-driven displays, and power-free light emission systems. However, in the ML field, there are still limitations to luminous materials for expressing various colors with high color purity, and research on new polymer matrix materials is necessary for application in various fields including wearable textiles. In this study, we introduce quantum dots with high color purity into ML matrix and develop the super-elastic polymer matrix with negative triboelectric series for enhancing the ML performance in terms of color purity and ML intensity. Furthermore, our works open the possibility of commercialization of ML technology by providing a path to develop ML films with high luminous efficiency.

Date : 2024년 12월 12일 (목) 오후 5시
Venue : 과학관 B130호
Host : 연세대학교 화학과