

■ 연구논문 요약문

논문제목	Virtual metrology for copper-clad laminate manufacturing
게재정보	Computers & Industrial Engineering
개요	<p>Copper-clad laminate (CCL), the key material for printed circuit board production, is used in various electronic products; thereby, the demand for CCL is on the rise. The process of CCL manufacturing occurs in three phases: treating, lay-up, and pressing, while the process with the largest influence on quality control is the treating. For effective quality control, the treating process requires intermediate inspection for three important quality factors: treated weight, minimum viscosity, and gel time. However, a manual inspection, which present-day manufacturers perform, incurs heavy cost in terms of time and money, rendering it ineffective. This study proposes the application of virtual metrology for CCL manufacturing to predict product quality derived from processing data without a product quality inspection. The actual process data from a CCL manufacturer in Korea was collected for a duration of approximately 5 months. Based on these data, the application builds a prediction model for CCL quality by utilizing the process variables affecting the CCL quality as predictor variables.</p>
연구결과	
활용분야 및 기대효과	<p>As a result, four regression algorithms and three methods of variable selection were applied to build the prediction models for virtual metrology. Prediction models were obtained with a high accuracy in specific target variables. It was also verified that quality control was influenced by not only the important predictor variables empirically recognized by process engineers in the field but also by several essential variables previously unknown to the engineers; effective quality control will be possible by focusing on these variables particularly and more efficiently instead of overall monitoring.</p>