

## **Methodized Depiction of Design of Experiment for Parameters Optimization in Synthesis of Poly(Nvinylcaprolactam) Thermoresponsive Polymers**

**Marwah N Mohammed, Kamal Bin Yusoh and Jun Haslinda Binti Haji Shariffuddin**

Faculty of Chemical & Natural Resources Engineering, Universiti Malaysia Pahang, 26300, Pahang, Malaysia

### **ABSTRACT**

Recently, common research on stimuli-responsive polymers comprising thermoresponsive polymers has been widely investigated. In this research study, the synthesis process parameters of poly(Nvinylcaprolactam) (PNVCL) a thermoresponsive polymer, has been engaged for optimization as an attempt. The response surface methodology (RSM), has been employed in the identification of the elevated factors affecting on PNVCL production conversion (%) yield. Four independent process variables including monomer concentration, initiator concentration, polymerization temperature and time were studied. Various polymerization combination factors consist of a set of experiment runs were discussed using the Box–Behnken approach in Minitab 16. The study efficiently established the procedure and recompenses of RSM, for the estimation of process response. The optimum value for the most significant (temperature and time) variables for maximum PNVCL conversion (%) yield were obtained to be ~80 °C and 92.5 min, respectively. Monomer and initiator concentrations were hardly effective on the (%) yield.

**doi: <https://doi.org/10.1088/2053-1591/3/12/125302>**