



Kinetics of Polymerization of Methacrylic Acid Monomer Initiated by Peroxo Disulphate – N,N,N',N'-Tetramethylethylenediamine

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ABSTRACT

The polymerization of vinyl monomer, Methacrylic acid (MAA) was carried out in acid medium under varying conditions of concentration, temperature, ionic strength and pH with potassium peroxodisulphate (PPS) – N,N,N',N'- tetramethylethylenediamine (TMEDA) couple as redox initiator at 50°C. The rate of polymerization, R_p was proportional to $[MAA]^{1.5}$, $[PPS]^{0.5}$ and independent of TMEDA. R_p was found to be insensitive to change in $[H^+]$ and also ionic strength. R_p showed an increase with increase in temperature. The activation energy E_a for the overall rate of polymerization has been found to be 10.4 k Cal.mol⁻¹. The value of composite rate constant was found to be approximately constant, $4.06 \times 10^{-6} \text{ mol L}^{-2} \text{ s}^{-2}$. Under steady state conditions the rate of polymerization is $R_p = (2k_p^2 k_3 / k_{t1}) [MAA]^{1.5} [PPS]^{0.5} [TMEDA]^0$

Keywords: Methacrylic acid, Potassium peroxodisulphate, N,N,N',N'-tetramethylethylenediamine, rate of polymerization.
