# Rheological properties of carboxymethyl cellulose (CMC) solutions

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**Authors:** A. Benchabane, K. Bekkour.

**Abstract**

In this study, we investigated the way of predicting two critical concentrations of sodium carboxymethyl cellulose (CMC) solutions using simple experimental procedures with a rotational rheometer. It was found that, above a critical shear rate, all CMC solutions (0.2 to 7 wt.%) exhibit shear-thinning behavior and the flow curves could be described by the Cross model. A first critical CMC concentration c*, transition to semidilute network solution, was determined using the following methods (1) study of the flow curve shapes, (2) Cross model parameters, (3) plot of the specific viscosity vs the overlap parameter, and (4) empirical structure–properties relationships. Furthermore, both creep and frequency-sweep measurements showed that the solutions behaved as viscoelastic materials above a second critical CMC concentration c** (transition to concentrated solution). The characterization of CMC solutions was completed with a time-dependent viscosity study that showed that the CMC solutions exhibited strong thixotropic behavior, especially at the highest CMC concentrations.

**Keywords :** Shear-thinning ;Cross model ;Critical concentration ;Viscoelasticity ;Thixotropy.

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