Properties of Uniaxial Elongational Viscosity of ETFE with Long-Chain Branch

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Abstract

Ethylene-tetrafluoroethylene copolymer **(**ETFE) is a melt-processable fluoropolymer having excellent weatherability, thermal and chemical stability. However, the influence of rheological properties on the ETFE copolymer has not been revealed enough well. Therefore, in this study, we investigated shear and uniaxial elongational behavious of ETFE melts.

We used Linear ETFE (C-88AX) and long-chain branched ETFE (FF205) provided by Asahi Glass Company limited. Fig.1 shows the storage (G') and loss moduli (G") of C-88AX and FF205 as function of frequency (ω) at 270 ^{o}C. As seen from this result, the slopes of G' and G" as function of ω for the FF205 were smaller than that of the C-88AX. In addition, terminal flow regime was not obtained for FF205. Fig.2 shows the result of uniaxial elongational viscosity of FF205 at 270 ^{o}C. We found that branched ETFE exhibited a strain-hardening. This phenomenon has never been observed for standard linear ETFE.

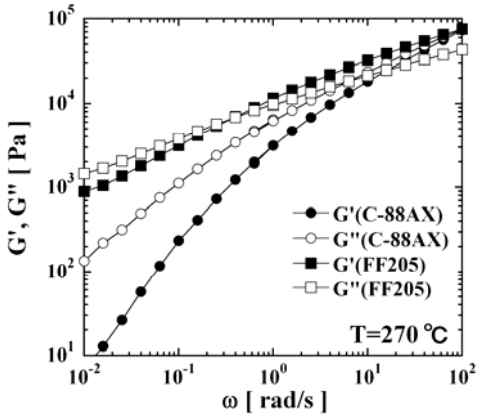

Fig.1 Storage modulus G' as a function of angular frequency for C-88AX and FF205 at 270℃

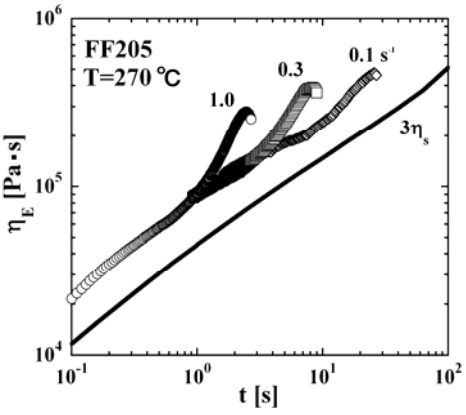

Fig.2 Uniaxial elongational viscosity under various strain rates for FF205. The solid line is calculated from the dynamic shear measurement in Fig.1