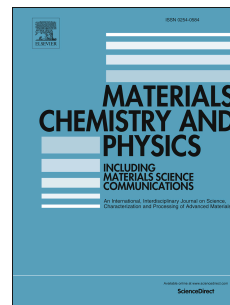


Accepted Manuscript

Styrene based copolymers for consistent reactivity ratio evaluation

Daniel Zaremba, Henning Menzel, Wolfgang Kowalsky, Hans-Hermann Johannes



PII: S0254-0584(18)30084-1

DOI: [10.1016/j.matchemphys.2018.01.077](https://doi.org/10.1016/j.matchemphys.2018.01.077)

Reference: MAC 20349

To appear in: *Materials Chemistry and Physics*

Please cite this article as: Daniel Zaremba, Henning Menzel, Wolfgang Kowalsky, Hans-Hermann Johannes, Styrene based copolymers for consistent reactivity ratio evaluation, *Materials Chemistry and Physics* (2018), doi: 10.1016/j.matchemphys.2018.01.077

This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Styrene based copolymers for consistent reactivity ratio evaluation

Daniel Zaremba¹, Henning Menzel², Wolfgang Kowalsky¹, and Hans-Hermann Johannes¹

¹ Technische Universität Braunschweig, Institut für Hochfrequenztechnik, Labor für Elektrooptik, Bienroder Weg 94, 38106 Braunschweig, Germany.

² Technische Universität Braunschweig, Institut für Technische Chemie, Abt. Makromolekulare Stoffe, Hans-Sommer-Str. 10, 38106 Braunschweig, Germany.

Correspondence to: Hans-Hermann Johannes (E-mail: h2.johannes@ihf.tu-bs.de)

ABSTRACT

The reactivity ratio parameters or r -parameters are the most important indicators for the characterization of copolymers. Consequently, over the last decades, a variety of methods have been developed to determine and predict the r -parameters. Among these, the prediction with the Alfrey-Price Q,e -scheme is one of the oldest and most commonly used techniques. The synthesis of 21 binary methacrylate-based copolymers with lauroyl peroxide as the initiator (radical starter) shows large deviations between the experimentally determined copolymerization parameters and those calculated with the Q,e -values taken from the established literature. Assuming an error tolerance of ± 0.05 , only 20.6% of the r -parameters were predicted correctly. To address this problem, copolymerizations with styrene as the comonomer are performed to maintain comparable Q,e -values. It is found that structural similarities of the monomers favor correct prediction. Furthermore, the use of specific parameter sets can improve the prediction, resulting in the maximum of 42.3% correct findings.

INTRODUCTION

Copolymers are an important compound class in polymer science since they enable a wide range of functions that exceed those of the homopolymers.^{1,2} However, even for the simplest binary copolymer five different copolymer types can be found. Examples of a homopolymer chain and various copolymer

Download English Version:

<https://daneshyari.com/en/article/7921943>

Download Persian Version:

<https://daneshyari.com/article/7921943>

[Daneshyari.com](https://daneshyari.com)