Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Channeling Polyolefin Molecular Structure - Bulk Property Correlation Strategies for Industrial Applicability ROHAN HULE, DEREK THURMAN, ANTONIOS DOUFAS, ExxonMobil Chemical Company — Polyolefins occupy a significant volume of the polymer products portfolio in commodity and high value applications. Quantifying and optimizing structure-property relationships enables growth in new markets. It is well recognized that coupling lab-based, comprehensive methodologies with bulk properties of interest to industrial environments offer the greatest potential of technology advancement, ultimately leading to commercial success. It is imperative to recognize the existing gap of knowledge translation between lab measurements and industrial-scale operability. This study highlights experimental HDPEs synthesized from dual, single-site, co-supported catalysts that exhibit enhanced solid-state properties such as stiffness, impact and ESCR surpassing conventional trends. Commercial resins across distinct sub-families were included as well. Commonality amongst these resins is bimodality and broad MW distribution with well-defined splits and spreads. Investigations on commercially relevant parameters such as melt strength, melt elasticity and shear thinning established excellent performance for experimental bimodals, corroborating potential benefits compared to commercial HDPEs. To summarize, the effort highlights well-recognized pathways such as improvements in mechanical and melt properties that can be attributed to apposite tuning of polymer chain architecture and MW distribution with implications across myriad markets. Ultimately, this may serve as a pathway for producing innovative products that deliver business success and growth.

Rohan Hule
ExxonMobil Chemical Company

Date submitted: 05 Jan 2017 Electronic form version 1.4