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# Direct Comparison of IR and DRI Detector for HT-GPC of Polyolefins.

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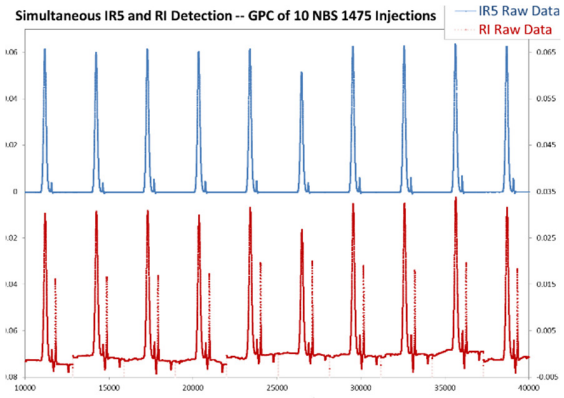
It is true that differential refractive index (DRI) detector is well recognized as one of the most commonly used concentration detectors for GPC. But, for the particular use in the high-temperature GPC (HT-GPC) analyses of polyolefins, an online filter-based IR detector specific to the C-H absorption band is a more preferred detector, such as the IR5-MCT detector recently developed from Polymer Char [1-2].

The advantages of filter-based IR detectors for HT-GPC of polyolefins are in two aspects: (1) capability for the copolymer compositional analyses with the multi-wavelength feature,[3] and (2) improvements in detector S/N and GPC baseline stability,[4] as the result of IR being much less affected by temperature and flow rate variations. Item (2) is the focus of this current investigation.

In this study, we installed an IR5-MCT detector to a GPC system already equipped with its built-in DRI detector. This is done so that we can make a direct and objective comparison for the performance of these two detectors. The DRI and the IR5-MCT detection data on several test samples were collected simultaneously and processed in the same way to compare the MMD results calculated from data of either the DRI or the IR5-MCT detector. The attempt here is to show the link between the improved baselines of IR over DRI, to the quality of the processed MMD results between the two detectors.

The study result showed that the IR data led to a more reproducible $M_n$ value of the samples. This is because, as expected, the IR5 baseline sees much less impurity peaks than the DRI baseline at the low molecular weight tail of the GPC curve at the long elution time. Although not being widely publicized, the same precision problems of DRI detector exists at the high molecular mass side of the GPC curve that affect the reproducibility of the $M_w$, and $M_z$ values, and the quality of the Mark-Houwink plot derived from the triple-detector GPC using data from additional online viscometer and light scattering detector. A novel approach to construct MH plots not using concentration detector is also presented and compared [5].

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