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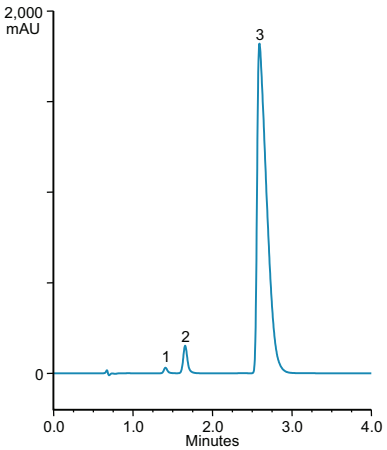
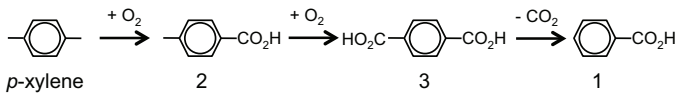
Terephthalic, Benzoic and *p*-Toluic Acids Using Acclaim Trinity P1



Column:	Thermo Scientific™ Acclaim™ Trinity™ P1, 3 µm
Dimensions:	3.0 × 100 mm
LC System:	Thermo Scientific™ Dionex™ UltiMate ™ 3000RS
Mobile Phases:	A: Acetonitrile B: 100 mM Ammonium formate, pH 3.5
Isocratic:	37% A, 63% B (v/v)
Flow:	0.425 mL/min
Temperature:	30 °C
Injection:	3 µL
Detector:	Diode array, UV 254 nm
Sample:	Standards in mobile phase

Peaks:		
	1. Benzoic acid	50 µg/mL
	2. *p*-Toluic acid	10
	3. Terephthalic acid	900



p-xylene 2 3 1

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Terephthalic acid is a primary ingredient in polyester plastics. It is manufactured by oxidation of *p*-xylene. The intermediate product is *p*-toluic acid, and the decomposition product is benzoic acid. The process therefore needs to be optimized for the minimum level of impurities. The Acclaim Trinity P1 column offers unique selectivity as the result of ion-exchange and reversed-phase mixed-mode retention mechanism. At pH 3.5, benzoic acid and *p*-toluic acid are mostly neutralized and retained mainly by hydrophobic interactions. Terephthalic acid is partially ionized and is retained mainly by ionic interactions. A suitable combination of pH, ionic strength and organic solvent resolves all three acids under isocratic conditions in less than four minutes.