Latest Developments In Flash Chromatography from Grace Reveleris® X2, Reveleris® Prep and Cartridges

U.S. Patent Numbers
8,115,930 8,305,581
8,305,582 8,314,917
AUS Patent
2008336091

GRACE
Materials Technologies

Grace: A Leading Specialty and Materials Company

Founded in 1854

Worldwide sales: $3.2 billion

6,000 employees in over 40 countries

Significant annual R+D Investment

Hold more than 1,970 patents worldwide

25% of our Scientists are PhDs

- We provide innovative technologies and value-added products and services around the world to enhance the quality of life.
- We are dedicated to our customers. They trust us to provide products, knowledge, technologies, services and the people to make their products work better.

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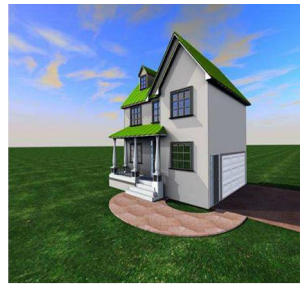
Did You Know?

Grace technologies are in common items you might use every day

- Toothpaste
- Tablets and pills
- Aluminum can liners
- Rubber and tires
- Paint ingredients
- Beer stabilizers
- Catalyst for Fuel & Plastics
- Construction Products



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Discovery Sciences - Our Products

Instruments

HPLC Columns

Prep Purification

Excipients

Intermediates

Solution-Oriented Product Portfolio

- It begins with high-quality silica – the foundation for all of our high performance LC columns, bulk media, and flash cartridges
- A full range of column hardware formats and sizes to address most separation needs from capillary to process scale
- Our silica and packed devices are complemented by innovative equipment and instrument systems
- Also, we carry a full range of accessories and supporting products to complete our total solution portfolio

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Discovery Sciences and the Organic Chemistry

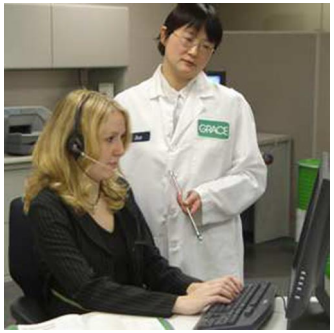
In the organic synthesis laboratories the most challenges of the R&D application are

separations of difficult mixtures

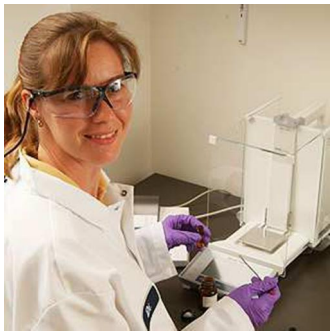
and

Purifications of target molecules

We help chemists to improve their results through our extensive experience in *silica bonding*, the art of *column packing*, and *detection technologies.*



Kelly Zahn, Purchasing
Wendy Luo, TCS



Dianna Olejniczak,
Lab Technician

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Goals and Priorities in Purification

- **Detect all components in mixture**
- **Faster purification**
- **Safeguard the sample**
- **Deliver high purities**
- **Maximize sample recovery**
  - **AND. . ..**
    - **BE MUCH FASTER**, but keep it simple
    - **NEVER SACRIFICE** any sample
    - **REDUCE** consumable, solvent and waste costs
    - **BE FLEXIBLE** in how you work
    - **SEPARATE BETTER** and more efficiently

Bottlenecks in purification, waste time and money and slow down compound synthesis

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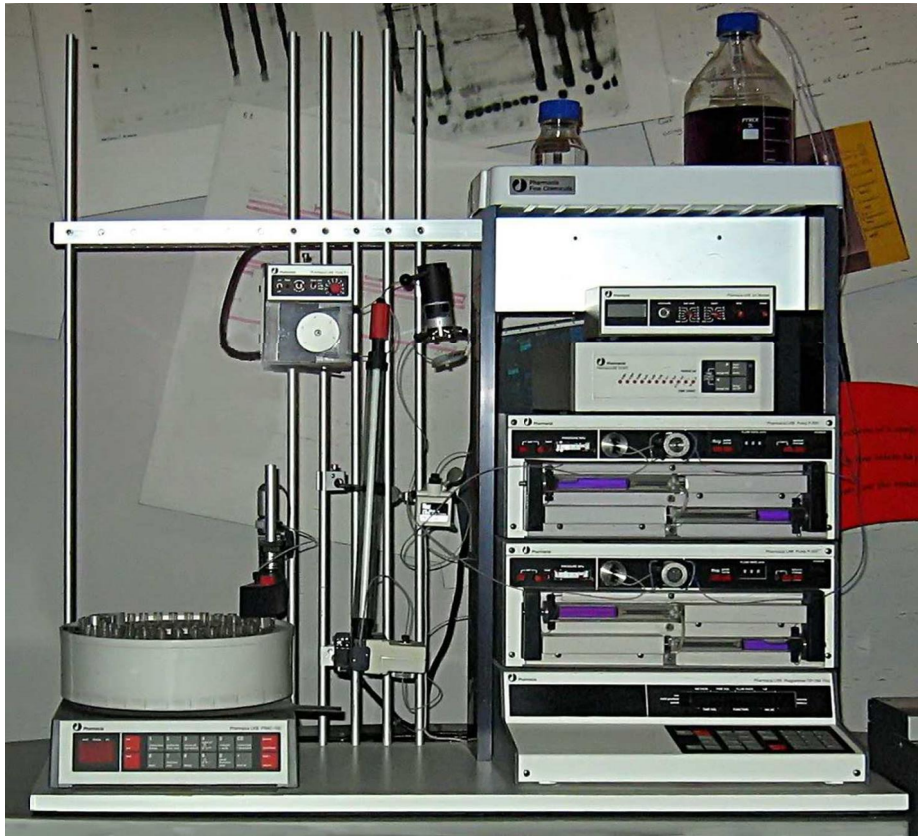
Challenges of Traditional Flash Chromatography

Gravity

UV Only



Fonte : Wikipedia - Un apparato per FPLC (*fast protein liquid chromatography*) esposto al Science Museum di Londra

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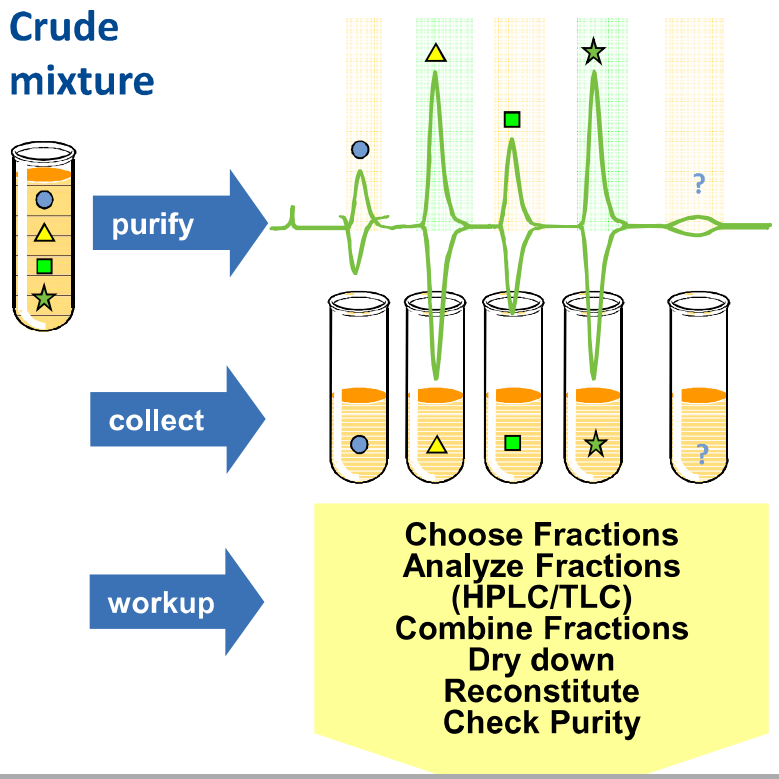
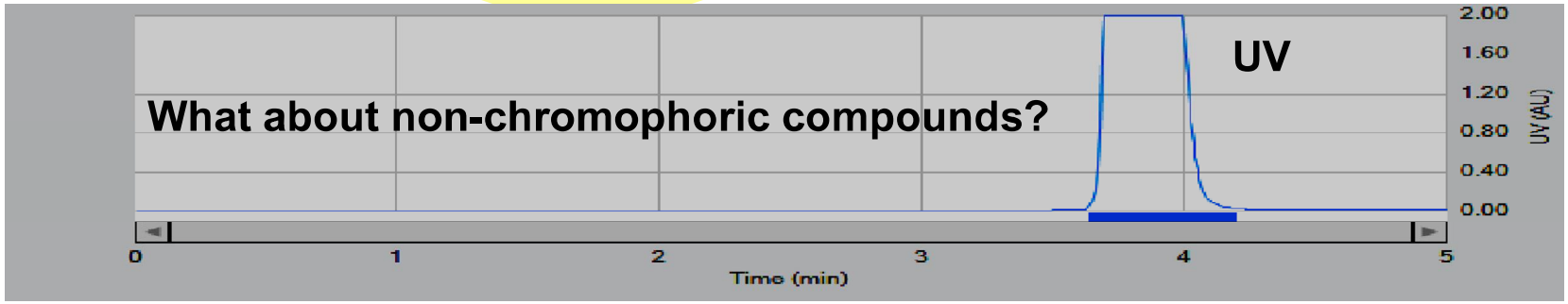
Limitations of Traditional UV Only Flash Chromatography



- Chromatogram does not reflect sample composition due to differing adsorption coefficients
- Non-chromophoric molecules are not detected - can't use for non-chromophoric targets and impurities
- Choice of solvents can be limited by UV interference
- Purification is not efficient due to additional work required



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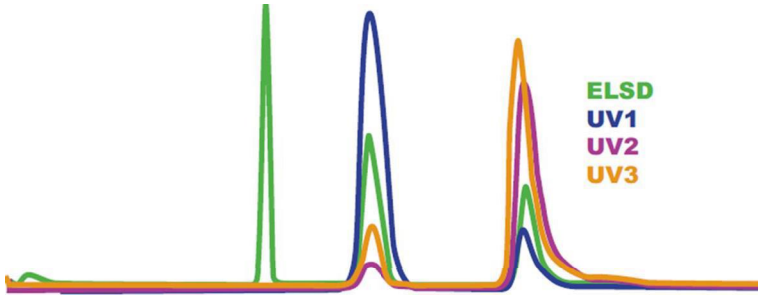
REVELERIS® X2



Benefits of ELS Detection with Patented RevealX™ Detection Technology

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How Does ELS Detection Work?

Step 1: Nebulization

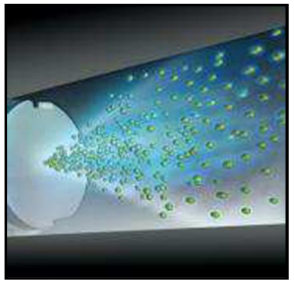
- Column effluent mixes with gas flow to form a dispersion of droplets

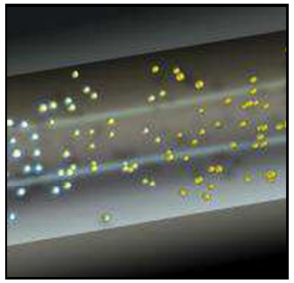
Step 2: Mobile Phase Evaporation

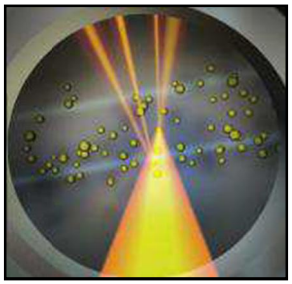
- Mobile phase evaporates from around sample particle leaving dried particles in solvent vapor

Step 3: Detection

- Sample particles pass through laser light in a flow cell. The particles scatter light that is collected by a photodiode







Benefits of ELS Detection In Flash Chromatography

- Allows purification of non-chromophoric molecules
- Allows you to see impurities not seen by UV
- Gives a more accurate indication of relative quantities than UV
- Give you the freedom to choose UV absorbing solvents

ELSD detects any compound less volatile than mobile phase

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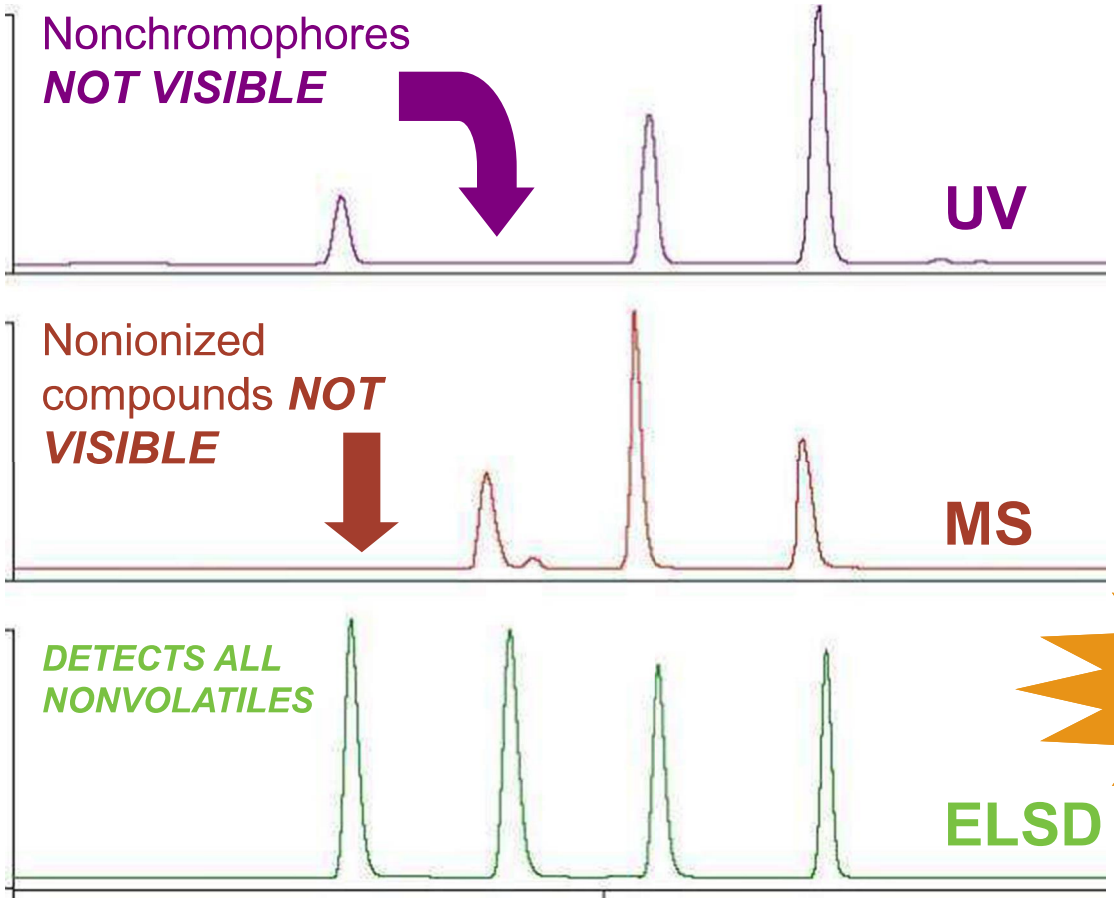
Detects all of the Components in a Sample



- HPLC analysis of 4 compounds
- With equivalent amounts of each

Even NMR misses impurities such as salts

Detecting all components eliminates guesswork and wasted time

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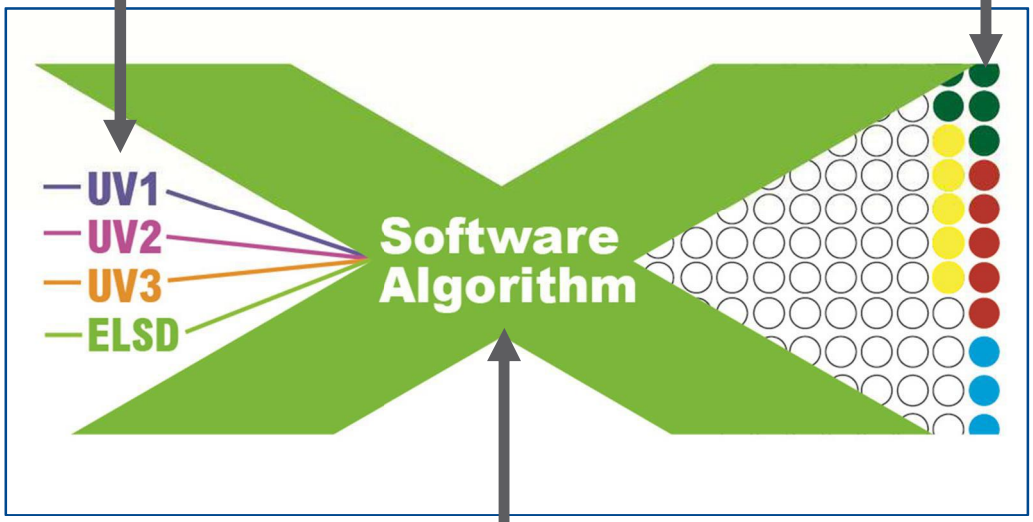
What is RevealX™ Detection Technology?

A patented* technology that enables identification and collection of UV-invisible components by flash chromatography

Multi-signal Monitoring - Simultaneously monitors select UV wavelengths and ELS detector responses

Accurate Collection - Correlates and tracks fraction collection from up to 4 separate signals



Advanced Signal Processing - Triggers on peak threshold or slope response

*U.S. Patent# 8,115,930

Patented UV and ELSD integration makes setup and operation easy

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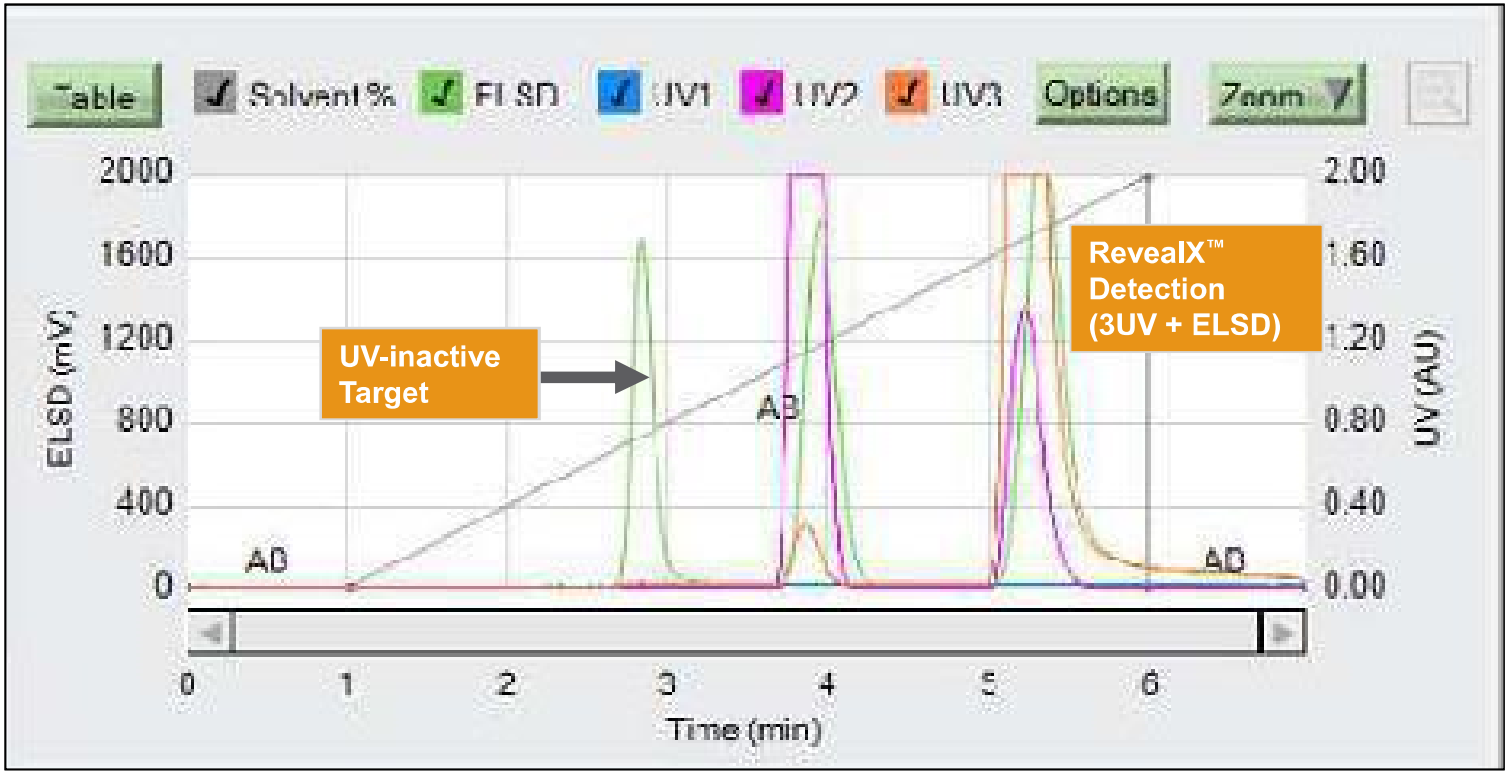
Non-Chromophoric Components Can Be Easily Identified and Isolated With Integrated ELS Detection and RevealX™ Detection Technology



RevealX™ Detection Technology identifies more and enables combined fraction triggering

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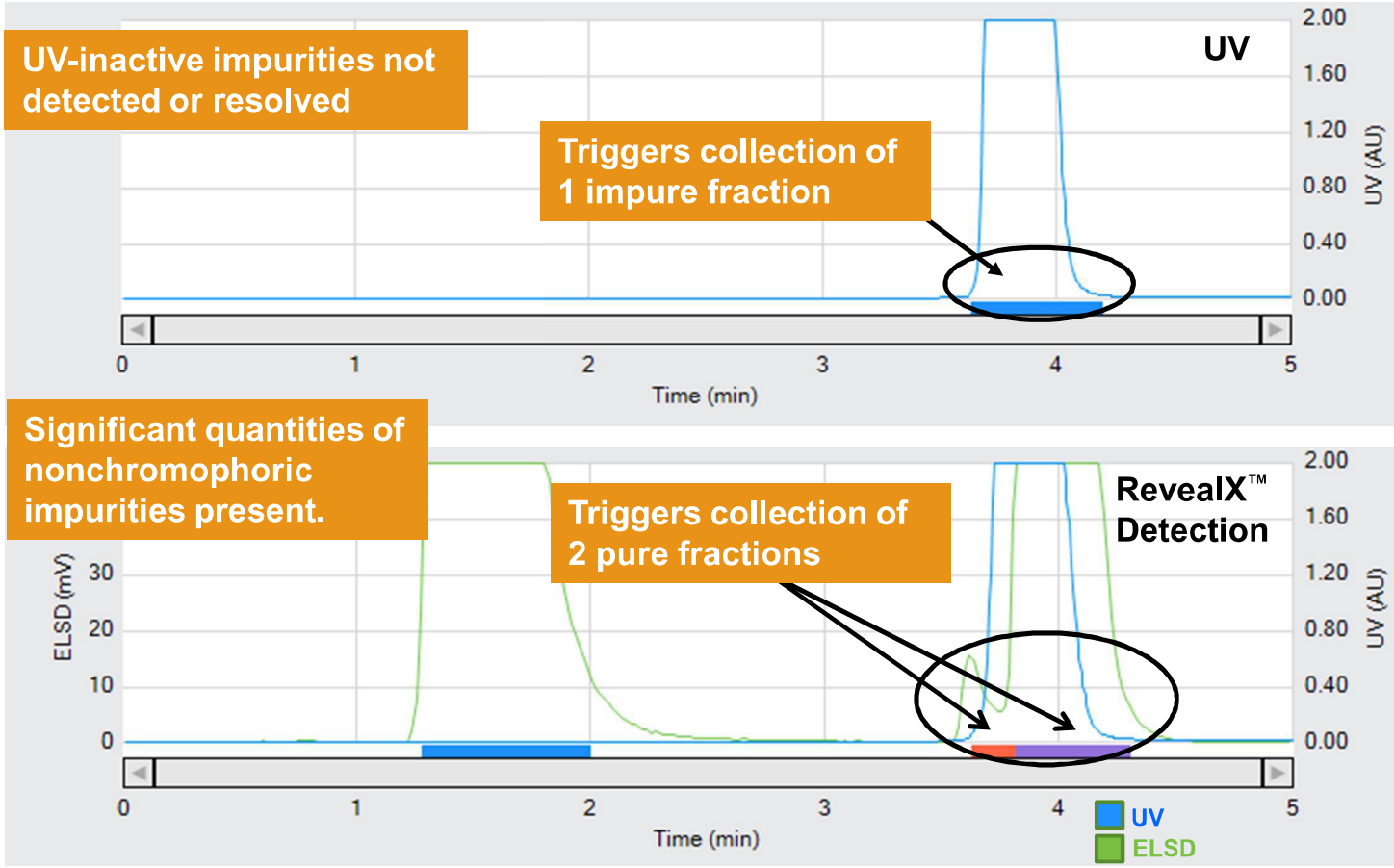
Detect Hidden Unknowns with ELSD and RevealX™ Detection Technology

Are non-chromophoric impurities present in your sample?



Reveal unknown impurities and improve the quality of submitted targets

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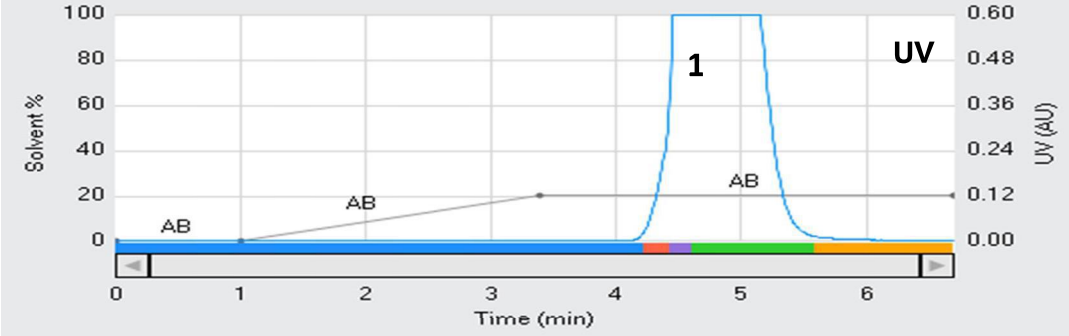
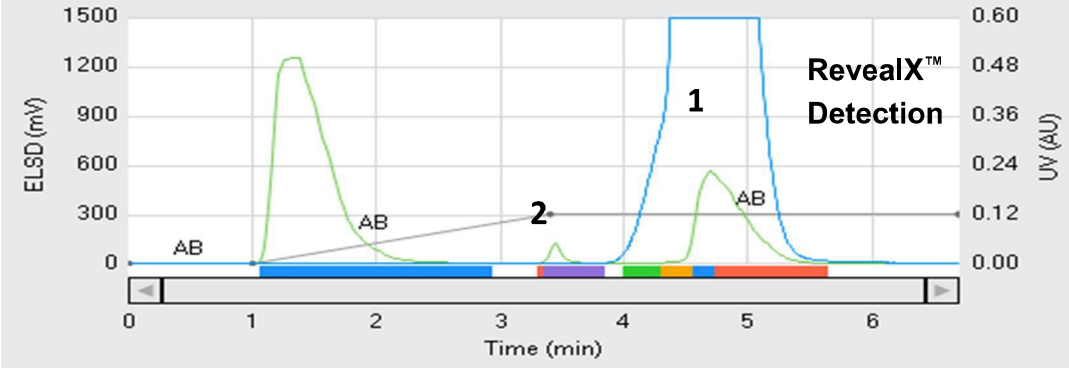
Minimize Fraction Workup with RevealX™ Detection Technology

- Check peak fractions knowing all targets and impurities have been identified
- Produce fewer number of fractions at reduced volumes

UV Only Collection: Need to analyze all fractions (14) to decide which are worth keeping?



RevealX ™ Detection Technology collects peaks and analyzes only those fractions that contain significant sample amounts



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