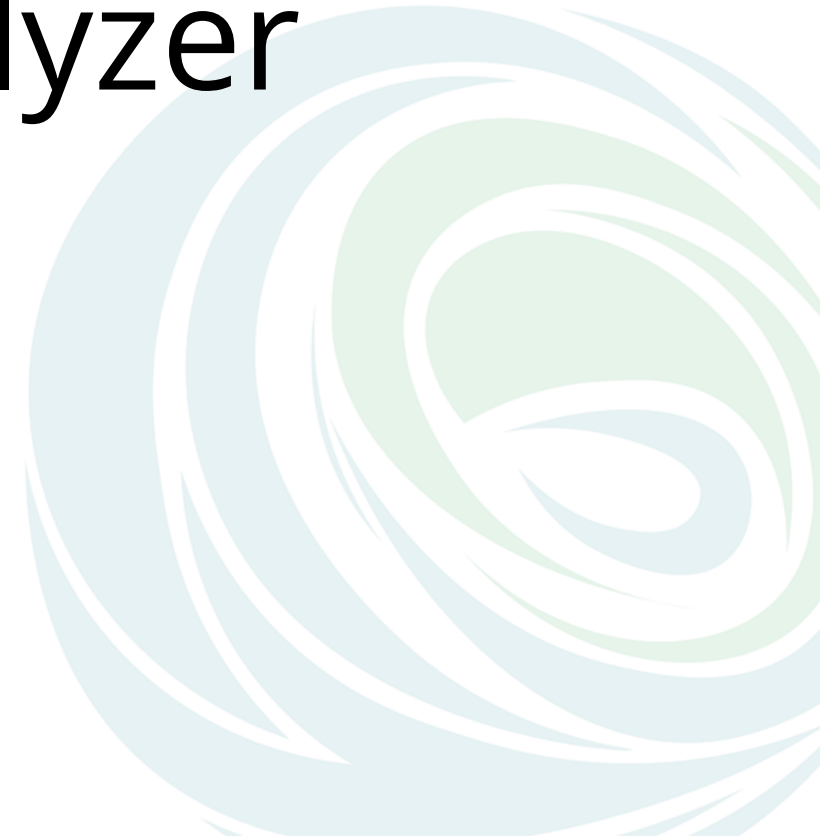


# Introduction to the MANTECH PeCOD<sup>®</sup> COD Analyzer



# About MANTECH

- MANTECH is a manufacturer of online, portable and laboratory analyzers for water and wastewater.
- With more than 2,000 analyzers installed in 45 countries, over 500,000 samples are analyzed everyday by MANTECH systems.



***MANTECH's mission is to generate the highest quality results in the shortest amount of time with the goal of enabling our customers to have significant positive economic and sustainable impacts on their businesses and communities.***

# Chemical/Biochemical Oxygen Demand

- Oxygen Demand is the amount of oxygen required to fully oxidize organic matter
  - It is used as a measurement of the oxygen-depletion capacity of a sample contaminated with organic waste
- Chemical oxygen demand (COD) is typically determined through a 3-hour chemical digestion of organic matter using hazardous reagents
- Biochemical oxygen demand (BOD) involves a 5-day incubation of sample to allow for biological oxidation of organic matter
- COD/BOD are valuable measurements for the determination of water quality in natural waterways and waste streams

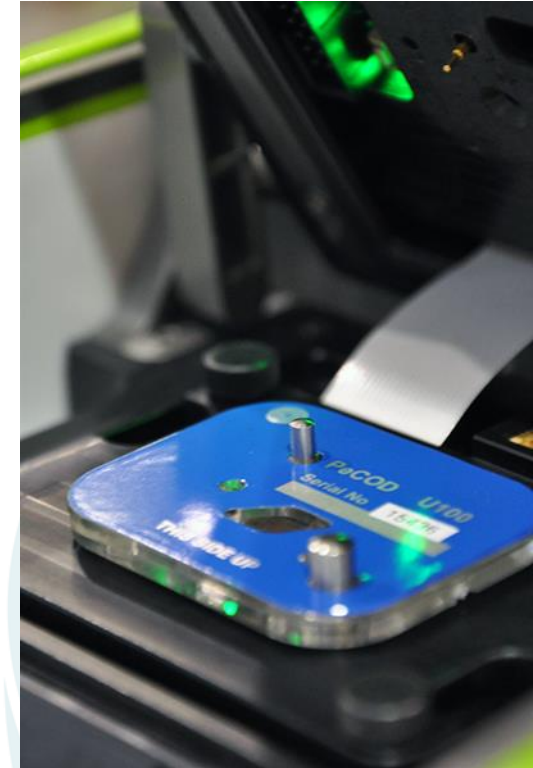
# PeCOD® COD/BOD Analyzer

- A patented technology that measures soluble COD/BOD in real time by oxidizing organic matter and measuring the extent of oxidation.
- PeCOD® eliminates the use of **mercury and potassium dichromate**
- Safe for both the environment and the analyst
- Results in less than 10 minutes
- Accurate method with a detection limit of 0.7 mg/L, and upper range of 15,000 mg/L

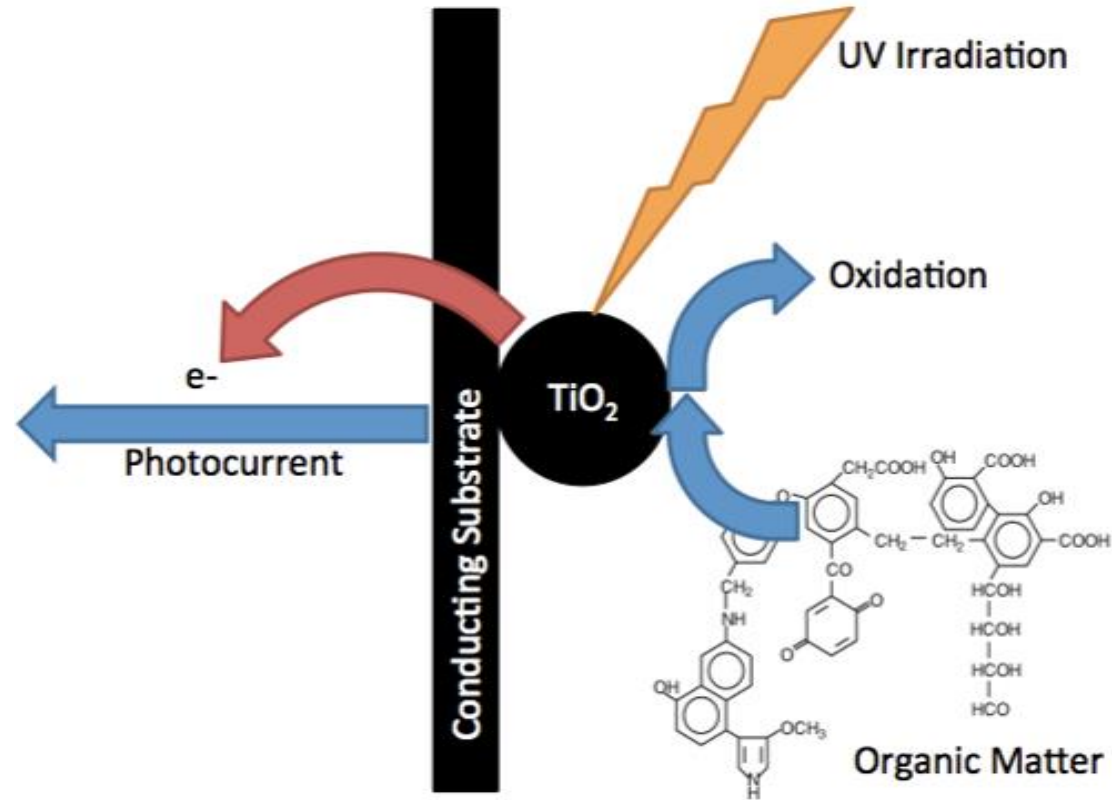


# Nanotechnology

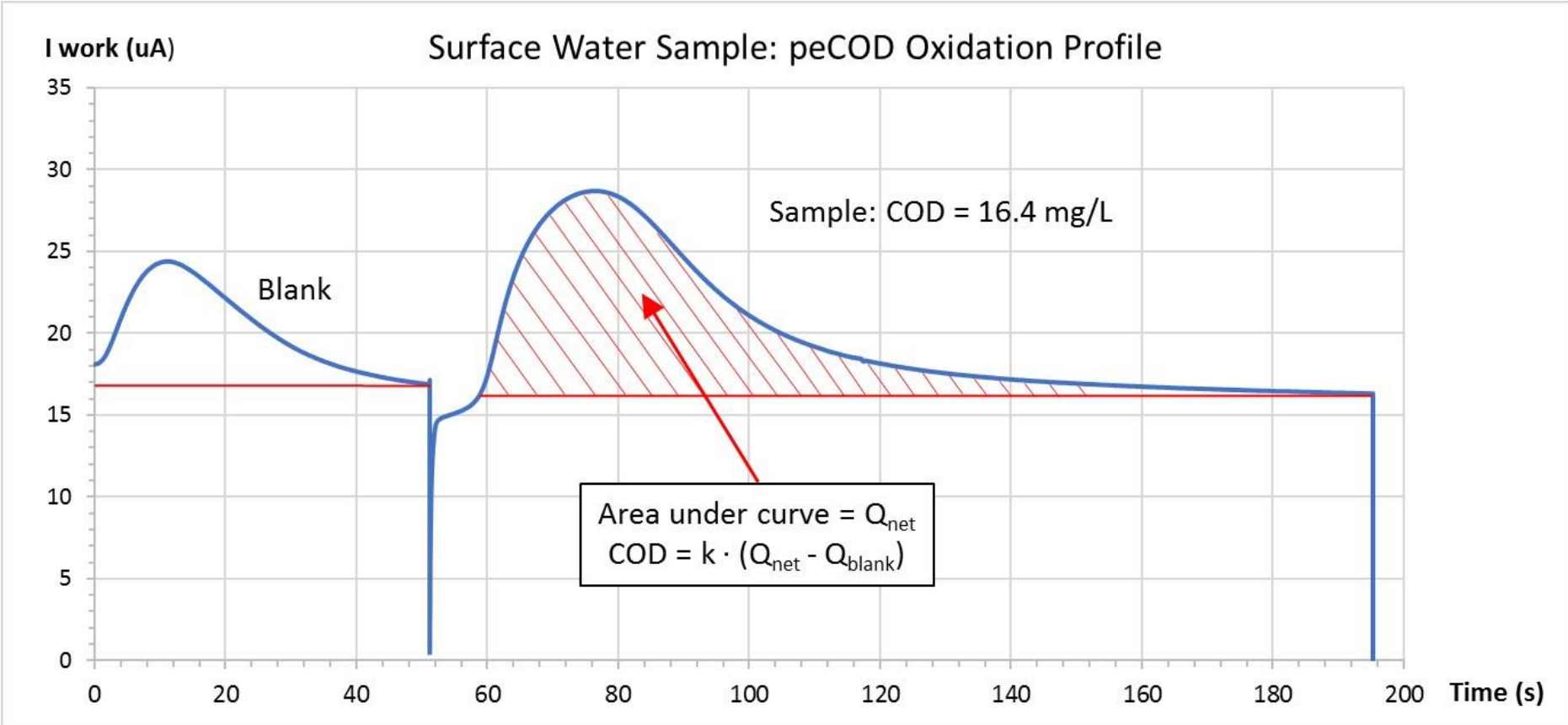
- The core of the technology is the PeCOD<sup>®</sup> sensor, which consists of a UV-activated nanoparticle TiO<sub>2</sub> (titanium dioxide) photocatalyst coupled to an external circuit.
- The powerful oxidizing potential of UV-illuminated TiO<sub>2</sub> ensures that virtually all species will be fully oxidized giving a true measure of COD/BOD.



# Reaction with $\text{TiO}_2$

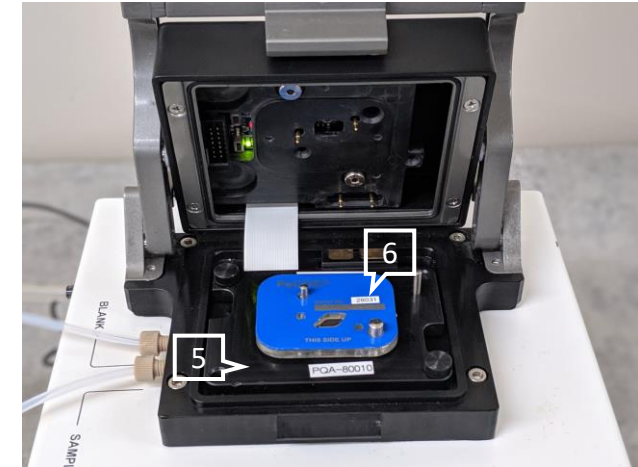


# Electrons to COD



# PeCOD<sup>®</sup> CODBOD Analyzer Components

1. Port A – for sample and calibration solution
2. Port B – for blank control solution
3. Port W – for waste
4. Analyzer Lid
5. Electrode Block
6. Sensor



## Consumable Items:

- Calibrant Solution – COD/BOD Standard
- Electrolyte
- Sensors



# PeCOD<sup>®</sup> Configurations

## Benchtop L50



- Minimal bench space
- Manual sample prep
- Portable – optional battery operation

## Automated L50



- Unattended analysis for a large number of samples
- Automated sample prep, calibrations, and rinsing
- Additional parameters can be added on, including pH, conductivity, alkalinity, and ammonia

\*Currently shown with an L100 but is now delivered with an L50

# PeCOD<sup>®</sup> Configurations

## Online L50

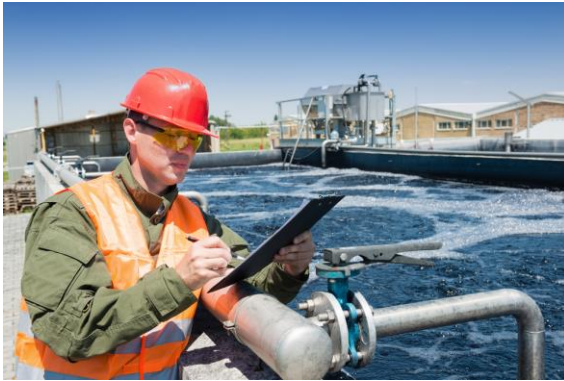


- Continuous sampling on timed intervals
- Grab sampling on operator's command
- Automated sample prep, calibrations, and rinsing
- Collects sample from flowing stream or stationary tank
- Multi-stream and Multi-parameter models available

\*Currently shown with an L100 but is now delivered with an L50

# PeCOD<sup>®</sup> Applications

## Municipal



- Incoming BOD monitoring
- Weather events
- Discharge compliance
- Potable water analysis
- Water reuse applications

## Industrial



- In-plant BOD monitoring
- Process optimization
- Discharge compliance
- Fine avoidance

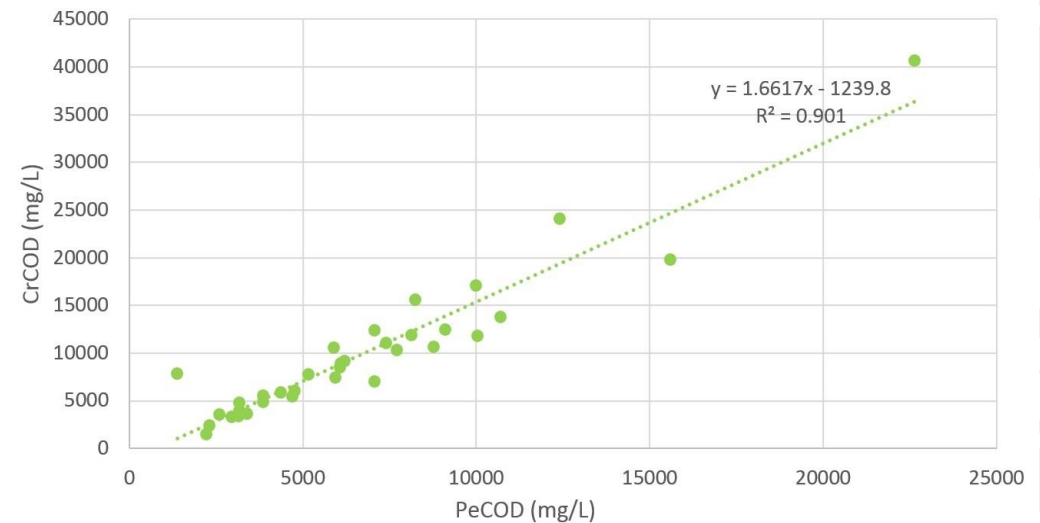
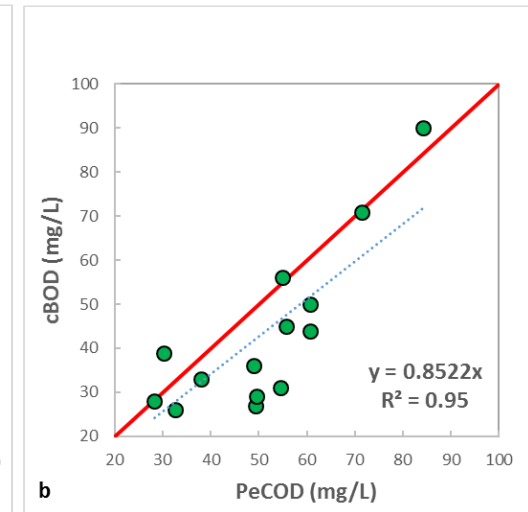
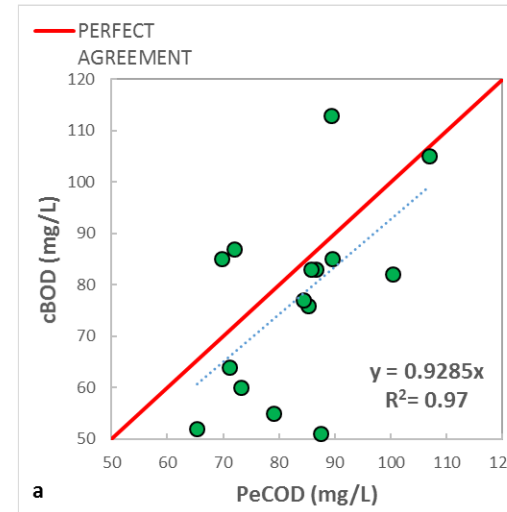
## Laboratory



- Rapid COD/BOD analysis
- Multi-parameter
- Improved accuracy and detection
- Safety of employees

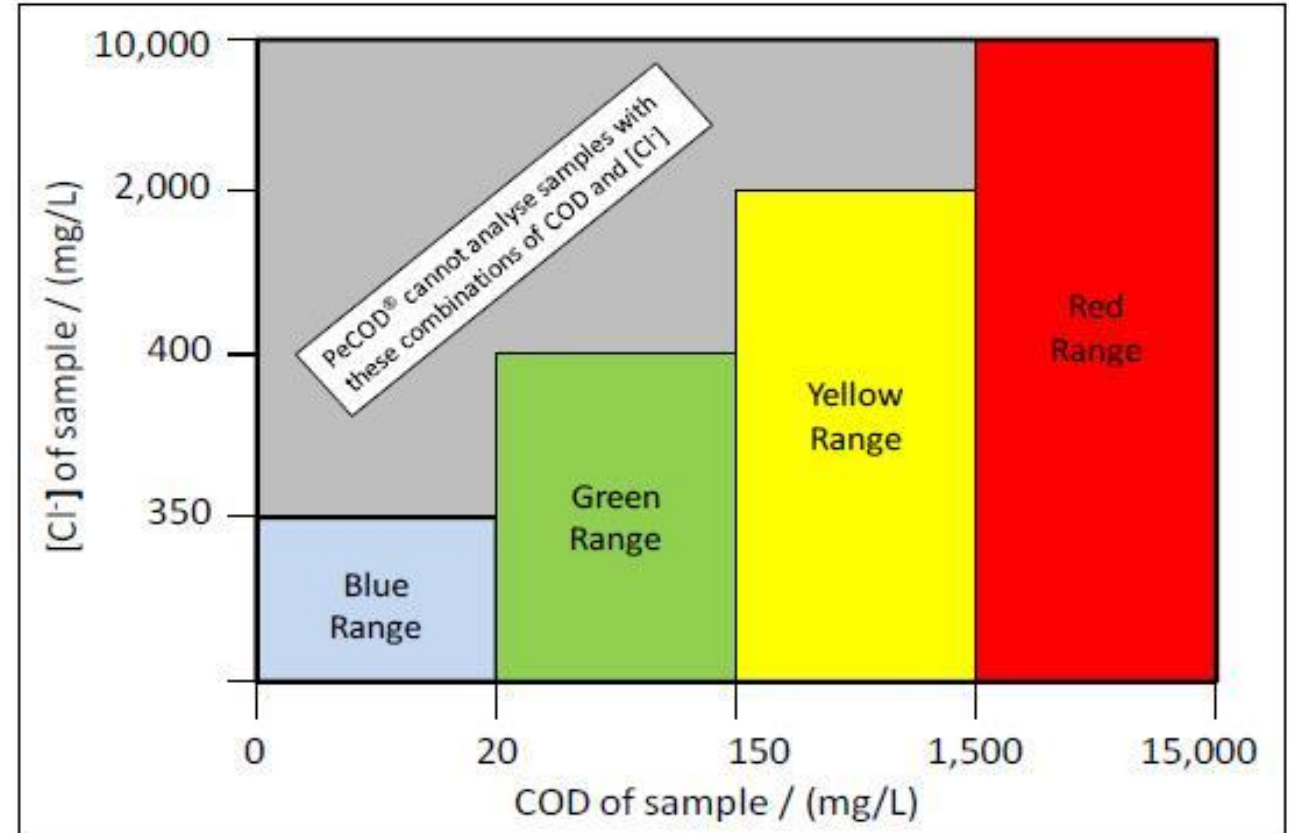
# PeCOD<sup>®</sup> WW Case Studies

- PeCOD correlations to BOD and COD<sub>Cr</sub> established across multiple industries
- New data from treatment plant customer shows good comparison for municipal WW final effluent
- Filtering at <50 microns required, 35-micron filters provided for WW customers
- Currently performing research on use of sample homogenizer to increase recovery for samples containing solids, initial results promising
- Both high and low concentrations showing strong correlation



# PeCOD<sup>®</sup> for Salty Samples Containing Cl<sup>-</sup>

- There are limitations to ensure that, after dilution with electrolyte, the chloride concentration will be <200mg/L.
- This means that the allowable chloride concentration of the original sample varies depending on the COD range (as illustrated below) since each range has a different ratio of sample to electrolyte.
- Customers simply determine what their chloride content is, then select the appropriate range to run in, or dilute their samples to bring the Cl<sup>-</sup> concentration low enough for the range they are running in



# Resources

- Website: <http://mantech-inc.com/>
- Email: [info@mantech-inc.com](mailto:info@mantech-inc.com)
- PeCOD<sup>®</sup> Analyzer – 10 min Chemical Oxygen Demand:  
<https://www.youtube.com/watch?v=ZsISmrh3zFk>

