

a plurality of input light sources each configured to generate at least one excitation wavelength;

optical fibers associated with each of the plurality of input light sources;

a light mixing pipe coupled to the optical fibers configured to transmit the at least one excitation wavelength from a selected one of the plurality of fibers;

a reference detector coupled to the light mixing pipe to receive a portion of the at least one excitation wavelength and generate a corresponding reference signal;

a sample cuvette positioned to selectively receive the pre-process and post-process water samples and to be illuminated by the at least one excitation wavelength from the selected one of the plurality of input light sources;

a multi-channel detector positioned to selectively receive and detect multiple wavelengths of light simultaneously transmitted through the sample and emitted by the sample for an absorbance measurement and a fluorescence measurement, respectively, in response to illumination by each of the at least one excitation wavelength; and

a computer in communication with the reference detector and the multi-channel detector configured to correct the fluorescence and absorbance measurements based on the reference signal, correct the fluorescence measurement using the absorbance measurement, and determine a water treatment parameter associated with the water treatment process based on the fluorescence and absorbance measurements of the pre-process and post-process water samples.

13. The water treatment monitoring system of claim 12 further comprising:

an optical fiber positioned to receive light transmitted through the sample cuvette and direct the transmitted light to the multi-channel detector during the absorbance measurement; and

optics positioned to receive light emitted by the pre-process and post-process water samples through the sample cuvette and direct the emitted light to the multi-channel detector without passing through any optical fiber .

14. The water treatment monitoring system of claim 12 wherein the plumbing includes a computer controlled valve to selectively deliver the pre-process and post-process water samples to the sample cuvette.

15. The water treatment monitoring system of claim 12 wherein the cuvette comprises a flow through cuvette and wherein the pre-process water sample flows through the cuvette during the absorbance and fluorescence measurements.

16. The water treatment monitoring system of claim 12 wherein the computer is configured to measure a first peak fluorescence emission wavelength and a second peak fluorescence emission wavelength emitted in response to the at least one excitation wavelength, determine a ratio of the measurements at the second peak emission wavelength to the first peak emission wavelength, and calculate a pre-process value for the water treatment parameter and a post-process value for the water treatment parameter based on a linear combination of at least the ratio and the absorbance measurement.

17. A system for monitoring a process using fluorescence and absorbance measurements, comprising:

- an input light source configured to generate light with at least one excitation wavelength;

- a sample chamber positioned to selectively sequentially receive a pre-process sample and a post-process sample and to be illuminated by the at least one excitation wavelength from the input light source;

- a detector positioned to selectively receive and detect multiple wavelengths of the light transmitted through the pre-process or post-process sample and simultaneously emitted by the pre-process or post-process sample during an absorbance measurement and a fluorescence measurement, respectively, in response to illumination by each of the at least one excitation wavelength;

- an optical fiber positioned to deliver light transmitted through the sample chamber to the detector for the absorbance measurement; and

- optics positioned to receive light emitted by the sample and deliver the light to the detector without passing through any optical fiber for the fluorescence measurement.

18. The system of claim 17 further comprising:

- a computer in communication with the detector configured to correct the fluorescence measurement using the absorbance measurement and determine a pre-process value for a water

treatment parameter and a post-process value for the water treatment parameter in response to the fluorescence and absorbance measurements of the pre-process and post-process water samples; and
a reference detector in communication with the computer and positioned to receive a portion of the at least one excitation wavelength, wherein the computer corrects the fluorescence and absorbance measurements based on a signal from the reference detector.

19. The system of claim 17 further comprising plumbing coupled to the sample chamber to deliver the pre-process and post-process samples.

20. The system of claim 19 wherein the plumbing comprises a computer controlled valve to control flow of the pre-process and post-process samples to the sample chamber.