analyzer, or a laser-based gas analyzer and wherein the second water vapor sensor includes one of a capacitive sensor, a resistive sensor, a thermal-conductivity-based sensor, an optical absorption gas analyzer, or a laser-based gas analyzer.

17. The method of claim **15**, further comprising continuously measuring the first water vapor concentration with the first water vapor sensor and continuously measuring the second water vapor concentration with the second water vapor sensor as the airstream continuously flows through or by the water buffering component, the first water vapor sensor, the sample chamber and the second water vapor sensor.

18. The method of claim **10**, wherein the first water vapor sensor is configured to measure a first concentration value of water vapor in the airstream exiting the water buffering component, and wherein the other components downstream of the water buffering component include at least:

the sample chamber, configured to receive the airstream exiting the water buffering component and to hold a sample capable of adding or removing water from the airstream, and

a second water vapor sensor configured to measure a second concentration value of water vapor in the airstream exiting the sample chamber.

19. A gas exchange analysis system, the system comprising:

a water vapor buffering component, the water vapor buffering component including a material configured to buffer water vapor in a flow of a gas, whereby fluctuations in the water vapor content in the flow of the gas are slowed for components downstream from the water vapor buffering component in the gas exchange system, wherein the components downstream of the water vapor buffering component include:

a first water vapor sensor configured to receive the flow of the gas from the water vapor buffering component and configured to measure a first concentration of water vapor in the gas;

a sample chamber configured to hold a sample capable of adding or removing water vapor from the gas entering the sample chamber, and to 1) receive the gas exiting the first water vapor sensor, or 2) receive the flow of the gas from the water vapor buffering component; and

a second water vapor sensor configured to measure a second concentration of water vapor in the gas exiting the sample chamber.

20. The system of claim **19**, wherein the material absorbs or desorbs water in the presence of a water concentration gradient.

21. The system of claim **20**, wherein the material includes a Nafion structure.

22. The system of claim **21**, wherein the structure is selected from the group consisting of a bead, a tube and a membrane.

23. The system of claim **20**, wherein the material includes one or a plurality of Nafion beads.

24. The system of claim **19**, wherein the water vapor buffering component includes a mechanism to dynamically adjust an amount of the material exposed to the flow of the gas.

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