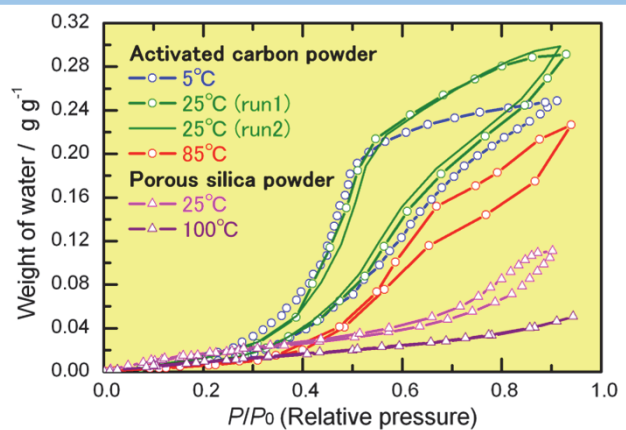
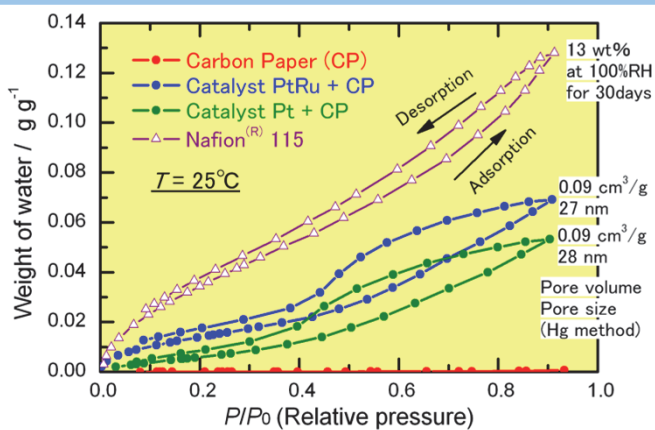


Water and vapor related characteristics of PEFC electrode materials

Water and vapor treatment in PEFC material affects the cell performance, so water and vapor related characteristics of membrane, catalyst layer and GDL is quite important. Vapor adsorption / desorption measurement and permoporometer are useful to obtain those information.

1. Vapor adsorption / desorption measurement

Isothermal vapor adsorption / desorption curves at RT and temperature variable

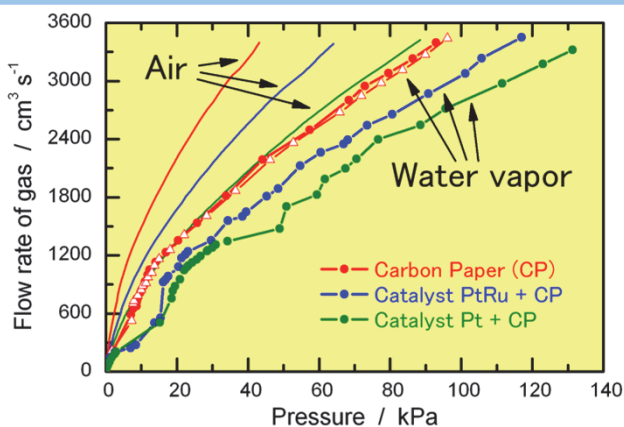


[Left] Catalyst layers with same pore volume and pore size show different vapor characteristic (Green and Blue lines), weight of adsorbed water on Nafion® at $P/P_0=0.9$ is same as that of 100 %RH controlled sample (13 wt %, purple line)

[Right] Same material shows different adsorption/desorption behavior at different temperature (Temperature variable range is 5 to 100 ° C)

2. Permporometer

Air and vapor transmission rate measurement



[Left] Air can transmit the sample more efficiently than water vapor, and catalyst layer limits the transmission of gases.

[Right] Water transmission can be measured, by which permeability constant, such as Darcy's gas permeability constant, can be calculated. Also, permeate pressure can be measured, as shown in the inset, which shows catalyst layer limits the water permeation

Water transmission and permeability measurement

