Tips for Capacitance Measurement

Measurement set-up:

On the source setup page for the 'CMH' source be sure to select the **Cp-Q** capacitance model (for our values of capacitance this gives better readings than a series model). Also, be sure to choose a cable length of 1 (our cables are 1m long after all). Cable length option is available for the 4284 by selecting CONFIG… in the device selection window. Finally, choose an **appropriate frequency**, e.g. 1MHz (note: units are Khz) and bias sweep range and voltage for the measurement. For now, also choose a short integration time and only one average. Later you can increase these values to get a cleaner measurement.

Before making your first measurement you must **calibrate** the lcr meter with the **Metrics software**. To calibrate with the Metrics software use the following procedure:
1) Select capacitor as the device to be measured in the Setup Editor.
2) Configure "CMH" source with desirable frequency, bias sweep range and voltage. Also select PAR as the capacitor/resistor circuit model as this is more indicative of our fabricated capacitors.
3) Click the Calibrate (OPTS) button on the top-right corner of the Setup Editor window. You will be required to do 'Open' and 'Short' calibration.
4) After calibration, you are ready to select 'measure' in Metrics.

If you don't do the calibration properly the software will give bad readings.

Frequency issue:

Remember that the cable impedance is a function of frequency and will change. So recalibrate the system whenever you want to change measurement frequency.

Trouble shooting:

When you see weird/suspicious capacitance values from your measurement (assuming that you know what your capacitance values should look like), please check the following things.
1) Did my calibration work properly? Do a measurement of the capacitance with the probe just lifted off again. It should be close to zero.
2) Are the probes in contact?
3) Did I just switch from a 'one probe' contact arrangement (as for field oxide and gate oxide measurements) to a 'two probe' arrangement (as for intermediate oxide) and forget to check the calibration?

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