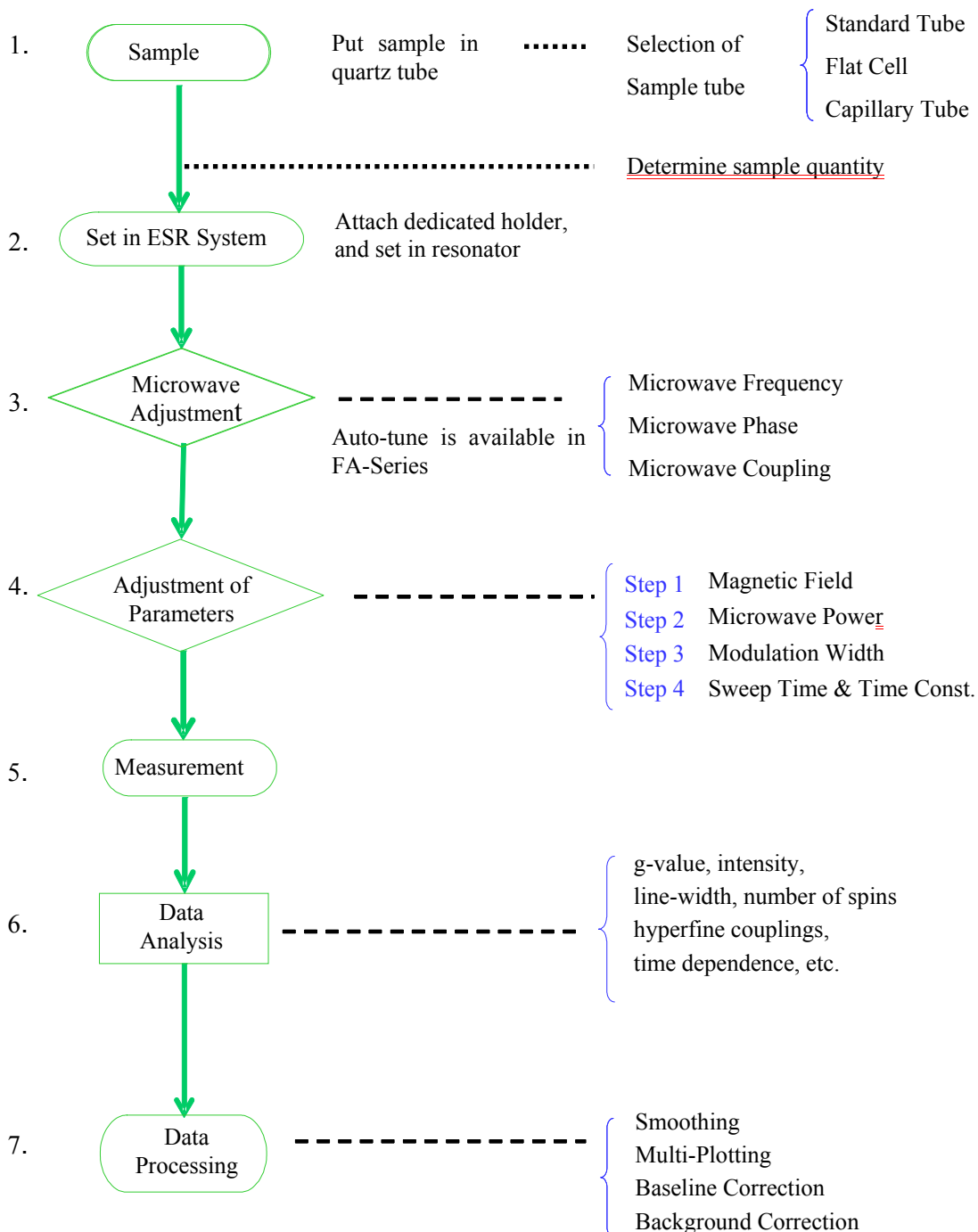


Let's Use ESR II - How to determine the sample quantity

ESR may be used to measure a wide range of samples. However, it is necessary to determine the most appropriate conditions for each sample. The following measurement flow chart gives a step-by-step approach. Here, we explain how to select the most appropriate sample tube.

ESR Measurement Flow



Sample Measurement Quantity Basics

- In case of any sample tube, sample should be about 44 mm high (required to fill the measuring length of 43.6mm). If you add more than this, it will not contribute to the measurement.
- The straight part of flat cell is long enough. So, it is not necessary to completely fill the cell. So long as 44mm is filled with sample it is sufficient, even if there are some bubbles above or beneath.

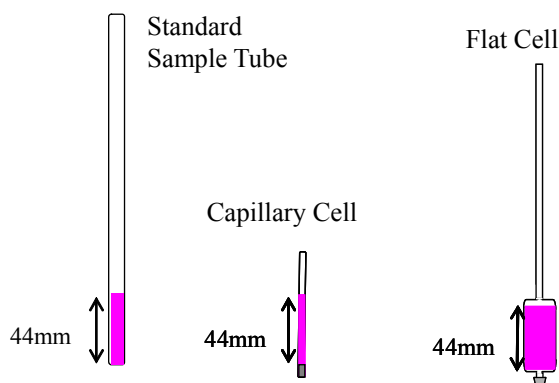


Fig.1 Samples in Different Tube Types

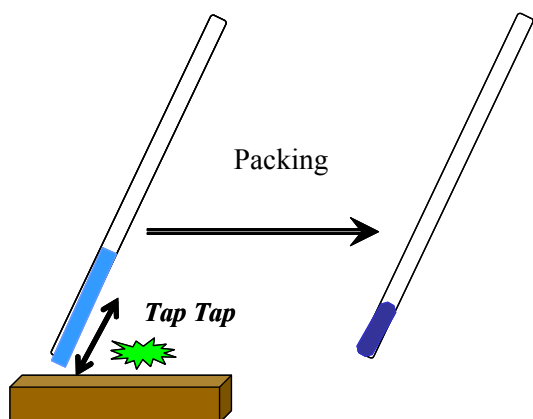
In case of smaller samples

If the sample quantity is insufficient, the above is not applicable. However, it is necessary to measure the same quantity if you want to compare the concentration of radicals. This is usually done by adjusting the sample quantities used to match the smallest one.

For samples which contain a lot of unpaired electrons, the signal may be too large to record, so the sample quantity needs to be reduced. Also, for samples of high conductivity or of large dielectric loss, the quantity may need to be reduced. Similarly, please adjust the measured quantities to be the same in order to compare the concentration of radicals.

Precautions for Measuring Powder Samples

There is a possibility that the actual measured quantity changes depending on how the sample is packed in the tube. It is important to pack the sample in the sample tube efficiently, for example, by carefully tapping the bottom of the tube (Fig. 2). Where possible, using particles of the same diameter yield more accurate quantitative measurements as they will pack more reproducibly. Also, weighing the sample gives more precise quantitation.



- For sample of high conductivity, there may be cases when even 1mg is too much to see the Q-dip clearly. For such samples, grind to make a fine powder and mix with high purity alumina or an inorganic salt, it may then become possible to measure.
- In cases where a large volume of sample is to be measured a large diameter sample tube is available. Please contact us.