



Figure 18.2 Schematics of electrochemical storage systems

equivalent to the converter; the transformed active mass is the storage. In conventional secondary electrochemical batteries, power and capacity depend on each other and cannot be designed independent of each other. In practice, there is a small margin for the design. For high-power and low-capacity requirements, very thin electrodes having a high surface-to-capacity ratio are used. Section 18.4 will go into the details of this type of batteries.

Nevertheless, the margin is limited and this is a drawback for autonomous power supply systems where high energy capacity is required and the power requirement is moderate. Therefore, electrochemical storage systems with separated converters and storage are of interest. The electrolyser/hydrogen storage/fuel cell system is a well-known option for the problem even though it is not yet a common commercially available solution. Details of this system will be discussed in Section 18.5.2.

A second class of storage systems with separated converter and external storage units are electrochemical Redox systems, where the reaction partners like iron and chromium salts or vanadium salts are dissolved in liquids and stored separately in tanks. The converter functions quite similar to a fuel cell. During charging or discharging, the electrolyte is pumped into the converter. These systems are not available in large quantities in the market yet, but there are several R&D activities on these systems. Section 18.5.1 will discuss this technology in more detail.

For a clear understanding of this chapter and to get familiar with the wording used in the “storage community”, the following two sections explain some basics. They are oriented very much on the application of storage systems in autonomous power