detail in Section 18.2.4. Often, instead of SOC the *depth of discharge* (*DOD*) is used in the literature or in data sheets. DOD is defined as 0% when the battery is fully charged and as 100% after the nominal capacity is discharged from the battery (DOD = 100% − SOC).

When looking up literature related to autonomous power supply systems, typically a *positive battery current* is defined to increase the SOC of the battery while a negative current decreases the SOC. However, please be aware that some authors use the opposite definition.

A *cycle* refers to a discharge followed by a recharge. Cycles used in data sheets always start from a fully charged battery up to a certain DOD. A nominal *full cycle* is a discharge down to 100% DOD. The *cycle lifetime* for a battery is given by the number of cycles as a function of the DOD. Nevertheless, in autonomous power supply systems cycles as defined above do not occur as can been seen from Figure 18.6. Many *partial cycles* within a *macrocycle* (time between two full charging states) occur, where a partial cycle is defined as the charge transfer within the time of the change of the direction of the battery current. Overall, charge transfer of batteries in autonomous power supply systems can be defined by the *capacity throughput*. It is given by the accumulated ampere-hour discharged from the battery divided by the nominal capacity. The resulting number is formally equivalent to the number of 100% DOD cycles delivered during the battery life. This normalised number will be referred herein as the capacity throughput.

The *ampere-hour efficiency* η_{Ah} is defined as the ratio of the ampere-hours discharged from the battery divided by the ampere-hours charged to the battery within a certain period (typically one month or one year or within a period between two full charging processes). Often the *charge factor* is used instead of the ampere–hour efficiency. It is defined as $1/\eta_{Ah}$. For a sustainable battery operation, charge factors greater than one are necessary.

The *energy efficiency* η_{Wh} is the ratio of the energy discharged from the battery divided by the energy charged to the battery within a certain period (defined as above).

The size of a battery is given by its nominal energy content in the fully charged condition. To express the relative size of a battery concerning the load in autonomous power supply systems, often the term *days of autonomy* is used. The "days of autonomy" is defined by the ratio of the nominal energy content of the battery (kWh) (sometimes the practical capacity according to Figure 18.3 instead of the nominal capacity is also used) to the average energy consumption per day (kWh/day). Therefore, the unit is "days" and expresses how long a system can be supplied only from the fully charged battery.

Battery currents are usually given relative to the battery size. The reason is that the strains and the current-dependent electrical properties are related to the specific current loads to the electrodes with respect to the active materials. For larger capacities just formed from parallel-connected electrodes or cells or from larger electrodes, the normalisation of the current to the capacity is an appropriate measure. Therefore, battery currents are expressed as multiples of the ampere-hour capacity or as multiples of the capacity-defining discharge current. For a battery with a capacity of $C = 100$ Ah, a current of 10 A is defined as $0.1 \times C$. In the example, 100 A is called the *C-rate*. I_{10} is the current that discharges a fully charged battery within 10 h down to the defined end-of-discharge voltage. The typical nomenclature for the capacity is C_x where x is the time in which the battery is