APPLICATION NOTE:

BATTERY SAFETY DATA DIRECT FROM MANUFACTURER

Safety of batteries under different temperature conditions needs to be verified experimentally and “adiabatic” calorimetry is the widely accepted method. Under adiabatic conditions, the temperature at which a battery starts to undergo self-heating is detected and this provides the maximum safe temperature under which it can ideally be used. In addition, the calorimeter allows the battery to continue thermal runaway and hence provides direct information about the extent of the hazard.

The data below was generated recently by MGL in China from one of their prototypes; photos of the battery before and after testing are provided.

FIGURE 1. LARGE BATTERY BEFORE AND AFTER THERMAL STABILITY TESTING IN BTC

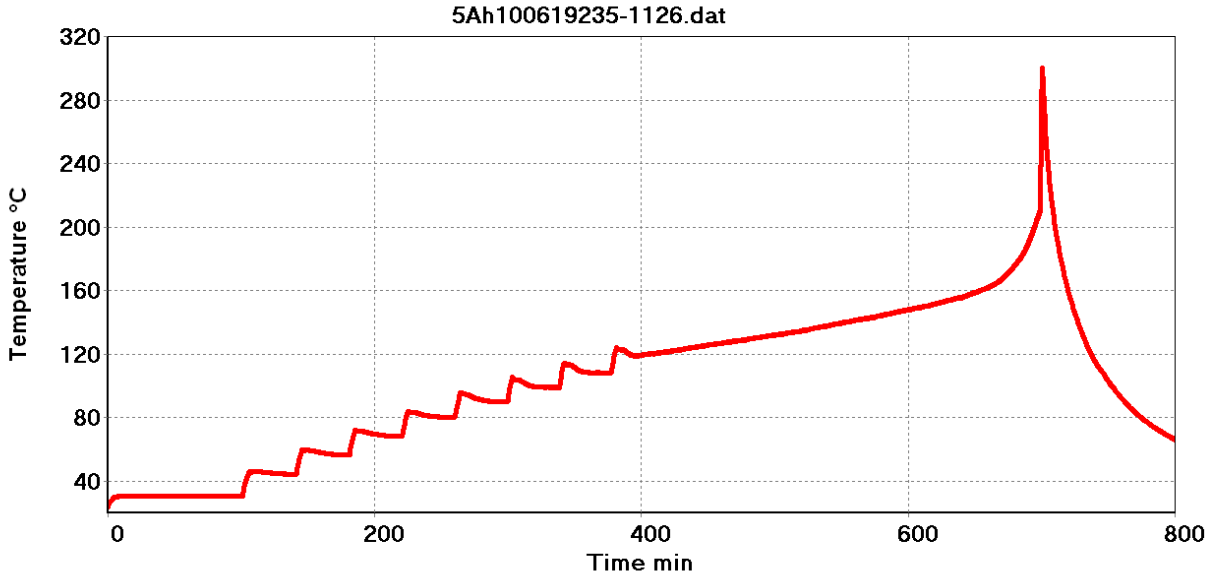

FIGURE 2. DATA RECORDED DURING BATTERY TESTING IN BTC

The data shows how the sample was tested in short heat steps until heat release at around 120°C was detected and after that the temperature continued to rise up to over 300°C.

This data was generated using the HEL Battery Testing Calorimeter (BTC) which allows the large and small batteries to be placed directly in the apparatus and tested without any particular knowledge of calorimetry. The BTC has numerous safety features that ensure the operator is totally protected even when large amounts of energy are released.

FIGURE 3. BTC CALORIMETER, FOR BATTERY THERMAL STABILITY TESTING

The BTC can also be used to determine heat generation when batteries are charged or discharged, enabling safe current limits to be determined. The heating rates measured can also be converted to power release (W) from the battery.

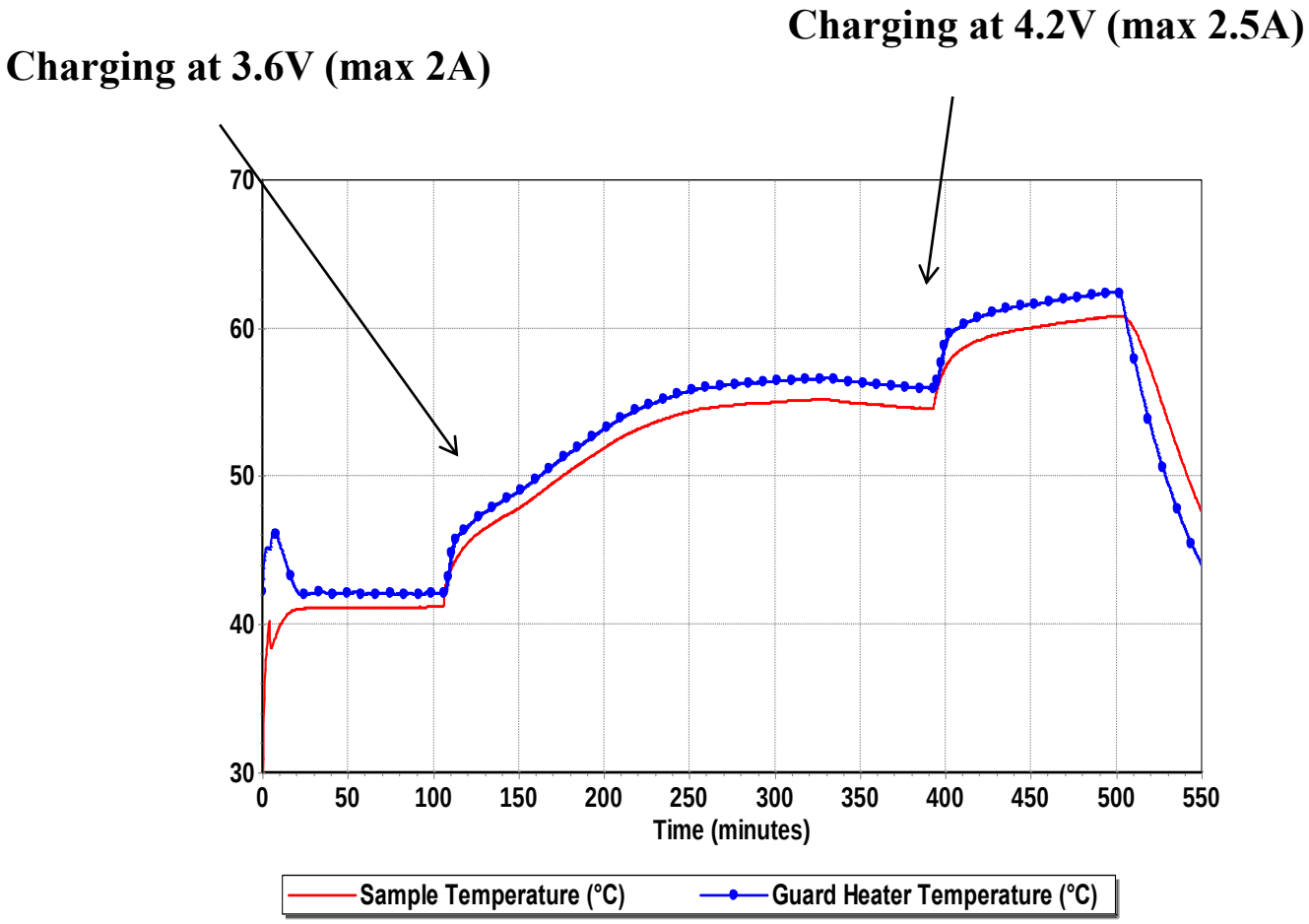

FIGURE 4. HEAT RELEASE MEASURED WHILE CHARGING A BATTERY AT DIFFERENT RATES