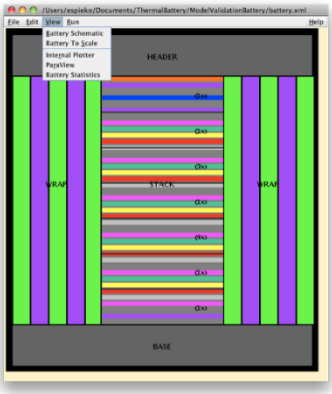
# Thermally Activated Battery Simulator (TABS) v5.0

The **Thermally Activated Battery Simulator**, or TABS, is a collection of software tools, developed by Sandia National Laboratories, specifically designed for performance simulations of thermal batteries. It enables a battery engineer or designer to quickly assess the thermal and electrochemical performance of a design using an intuitive graphical user interface (GUI) on a desktop computer. TABS is comprised of two modules: Full Battery (TABS-FB) and Single Cell (TABS-SC). TABS is currently on its fifth major release (v5.0).




**TABS-FB** is intended for simulation of **heat transfer within a thermal battery**. It captures heat generation and transport throughout the entire life of the battery, including initiation, heat pellet burn, thermal diffusion, activation, active life, heat loss through the case, and freeze out. The battery geometry is constructed graphically and intuitively, and is modeled using 2D axisymmetry for expediency. It can model side-fired or center-hole-fired configurations. Materials and their properties chosen from an included materials database which can be edited by the user. Quantities of interest can be post-processed within TABS itself or the results can be exported to Paraview for more flexible post-processing. Simulations run in minutes. **New in v5.0** is the inclusion of heat paper burn during activation, enabling study of top-to-bottom differences in cell rise times. The materials database also allows the specification of composite materials, enabling easy study of the effect of pellet mixture ratios.

**TABS-SC** allows **coupled thermal, electrochemical, and mechanical predictions of a single cell**, with the ability to predict voltage and current as a function of time and temperature. It offers several simulation modes, including 1D electrochemical, 2D thermal, and various 2D thermal-electrochemical-mechanical options. Geometric representation, materials, and post-processing options are identical to TABS-FB. 1D electrochemical simulations can run in as quickly as 10 minutes. **New in v5.0** is the addition of mechanical deformation of the separator during activation and partial saturation of the electrolyte (two-phase transport). Electrochemical processes have been completely recalibrated from the previous release, and CoS2 batteries are now supported.

Licensing for TABS within the US Government and its prime contractors is through a Government Use Notice (GUN), which allows use in direct support of government work/contracts. TABS is comprised of a suite of tools that must be individually installed, including the TABS GUI, Sierra Mechanics, Cubit, and Paraview. Because of the nature of these tools, they perform best on a Linux-compatible operating system, including native Linux, Mac OX, and Linux virtual machines on Windows. We recommend installation on a multi-core workstation.

For additional information on licensing or using TABS: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