

Damascus energy storage for microgrids

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Presenting a multi-objective framework for the short-term scheduling of a microgrid (MG) incorporating a plug-in hybrid electric vehicle (PHEV), with cost and emissions as dual objective functions.

Incorporating the proposed SaCryStAl optimization technique to simultaneously minimize costs and emissions, generate Pareto optimal solutions, and determine the optimal compromise solution using a fuzzy satisfaction method.

The mathematical model of CryStAl, which applies the fundamental ideas of crystal formulation with the appropriate adjustments, is described in this part. All possible solutions to the optimization procedure are viewed as individual crystals in the solution space in this model. Initial crystals are generated randomly74. The idea of adding a basis to lattice points to create crystals served as the inspiration for the crystal structure algorithm. Siamak Talatahar suggested this crystal structure algorithm in 2021 based on this idea75.

where Xi,j is the jth variable in the ith solution vector, where m is the problem's dimension and N is the number of crystals or potential solutions. "(r) " is a random number between [0, 1], Lj and Uj are the variables, lower and upper bounds. The structure of the initial population matrix is shown in Eq. (2).



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