Cofiring of coal plus a sulphur free feedstock i.e. municipal waste in fluidized bed reactors has been an interesting pathway to reduce SOx emissions where, for example, economical alkali (Na or K) or earth alkali (Ca) bearing sorbents are added to the cofiring feedstock.

However, a large array of cofiring feedstock and sorbent formulations are normally generated to find the optimum operating conditions in terms of maximum emissions reduction and prevention of defluidization state. The latter occurs due to either the inorganic content of the feedstock or the alkali components of the feedstock that combine with the bed material forming low temperature melting eutectics at the surface. Occurrence of the defluidization state in a large-scale fluidized bed reactor causes a lot of operation delays due to overhaul, reactor cleaning and bed material loading.

Performing such high temperature screening tests, between 800 and 1200 °C, in the pilot reactors is very challenging, labour demanding and costly. On the other hand, the available micro reactors have limitations to mimic cofiring conditions in the large-scale reactors.

The novel Induction Heating Fluidized Bed Reactor (IHFBR), 2.5 cm diameter and 7.5 cm height, provided a fast heating rate, quick and accurate solid feeding technique, durability at extremely high temperatures, and convenient operation making it ideal for a large set of coal-based cofiring screening tests. It was also discovered that the defluidization state could be easily predicted. Therefore, a considerable amount of time and cost, i.e. cost of material, operation and equipment was saved.