Pressurized Gas Heaters

The quickest road to cold fusion room heaters may be to build on the Arata-Zhang gas loading work using metal oxide nanometal composites described in their ICCF12 paper at elevated temperature, as discussed in the Chapter on Slow Burn Simplicity. Such heaters would require a start-up heater to raise a portion of the heater assembly to operating temperature. It's just like using lighter fluid to start burning charcoal. The A-Z tests with ZrO_2-nanoPd composites indicate that with a larger volume apparatus heated to 140 ^oC the operator could turn off the auxiliary heater and the apparatus would continue to generate heat. The decreased surface/volume ratio that goes with a larger assembly reduces the heat loss/heat generation fraction. Therefore it seems probable that with a large assembly of the tested type, continuous heat production with no power input can be achieved. Once achieved, the heater would stay hot using only cold fusion reaction heat. The escaping cold fusion heat would continue to heat the room without consumption of electrical power. Convective heat flow like that present with hot water radiators would then heat the room. The heater could be turned off by using cold water to cool the inside of the heater below reaction temperature. The Turn-off cooling would be like adding cold water to a boiling-hot kettle.

Unfortunately, palladium is a costly noble metal. The cost of the Pd used in the assembly would be too high to be used in a commercial device. The good news is that it may well be possible to use nanoNi to the replace nanoPd. It has not yet been shown that deuterium gas + ZrO_2-nanoNi nanocomposite will produce cold fusion heat. However, as previously mentioned, the A-Z nanometal fusion program from its start in 1994 has used the absorption properties of test nanometal at low hydrogen pressure as a criterion for recognizing good fusion-producing material. If a batch of Pd powder has the hydrogen absorbing characteristics of Pd metal filings, then the material is not useful. Pd metal filings have the same absorption properties as bulk Pd metal. At 1 atmosphere of pressure, the equilibrium value of H/Pd is about 0.7 at room temperature. The ratio does not increase much in value with pressure. With good nanometal powder hydrogen absorption creates a H/Pd ratio significantly greater than 1. With ZrO_2-nanoPd at 100 atmosphere, the H/Pd ratio is almost 3. The encouraging information is that the hydrogen absorption properties of ZrO_2-nanoNi composites have been measured, and they are as good as those of ZrO_2-nanoPd. (Replacing about 15% of the Ni atoms with Pd creates a composite with absorption properties that are considerably higher than those of either ZrO_2-nanoPd composite or ZrO_2-nanoNi composite.) These data were reported by A-Z at the ICCF10 Conference in 2003, and published as Figure 5 in the *Proceedings ICCF10* (2006), p.144.

From an engineering perspective, the metal oxide-nanometal composites seem to catalyze the production of nuclearly reactive deuterium in accord with a near-equilibrium reversible chemistry process. A near chemical equilibrium process means that the chemical portion of the overall reaction is not bothered by instability-stimulated loss of deuterium. This is not the case when bulk Pd is used. The freedom from chemical instability minimizes development problems. In the development plan outlined later, testing of ZrO_2-nanoNi composite for heat generation is given highest priority.