

The Iron Dumpling Assay Essay

Here's a couple of pictures-worth-a-thousand-words showing a fire assay method I've been tinkering with. It's not intended to provide a true quantitative analysis, but to give a simple comparative number to test and compare unknown ores. This method was quite helpful on my recent trip to Sudan, as we searched for a viable ore.

The clay is my usual furnace clay- kaolin with lots of sand and grog. Pinch out a bowl. Mix 25 g of finely ground roasted ore with 8g of finely ground charcoal. Put the ore and charcoal in the bowl, and pinch the top shut, leaving a little vent hole in the top. Set it on forge to dry, and then slowly bring up the blast in the forge. Once all is all nice and white hot, and the vent hole is no longer darker than the outside (meaning the heat has reached the center). This might take about 20 minutes. Then keep a nice white heat for a full 15 minutes more. Then cut the blast, and leave it to cool in the fire.

The main challenge in this is to keep the dumpling upright in the fire- I find it's helpful to use a small rod in the vent hole to tip it back up vertical every minute or so.

Here is the fired dumpling. For scale, the outside diameter of the dumpling 7.5 cm.



The photo below shows the dumpling cracked open, revealing the bead of iron. In this case, the 25 g of ore yielded a 13g bead of iron. It seems my good ores give 12 to 15 grams of iron.

Besides giving you an idea of the iron content of the ore, it seems this method also might help predict the self-fluxing character of the gangue materials. If there's something there that will give you a nasty recalcitrant slag in the bloomery, it will also keep the iron from gathering into a nice bead, but instead stay in little separate prills. (I'm not sure about that last part, but it seems so).



So give it a few tries, and see if it helps you. If you have trouble with the dumplings cracking and spalling, add a lot more sand.