**SUPPLEMENTARY DETAILS**

The design of a purpose-built induction coil depends on many factors. These include the size and shape of the magnetic field that is needed, as well as the required strength of that field. Induction heating is an old technology which is still used in many industrial settings and there are many available sources covering induction coil design. One of these sources is a paper by Stanley Zinn and S.L Semiatian, **Coil and fabrication design: basic design and modifications**20. This paper gives basic information on induction heat coil design, which includes optional shapes and materials. Also, Georgia State University offers online calculators to determine the inductance of a solenoid coil design (http://hyperphysics.phy-astr.gsu.edu/hbase/electric/indsol.html) and expected solenoid magnetic field strengths for solenoid coil designs (<http://hyperphysics.phy-astr.gsu.edu/hbase/magnetic/solenoid.html#c3>).

To design the 14-turn solenoid coil, we first determined the size of the solenoid that would be needed to hold our samples. After determining the size, we used the Georgia State calculators to ensure that the inductance of the coil was within a range that was compatible with our generator and that we would have sufficient power to provide the field strengths that we would need. Once the coil was built, it was mounted on the signal generator and the system was tuned to the desired resonant frequency by adjusting the number of capacitors in the generators resonant circuit. Fine tuning was accomplished by adjusting the generators internal inductance coil.

To operate the system, the coiling systems are activated, and the main power supply is turned on. When the system is fully powered up, the generator is turned on and the signal pulses are sent to the resonant circuit which creates the magnetic field within the solenoid coil. Varying the voltage to the coil increases the current flow and increases the field strength in the coil. Typically, the voltage and/or current limits of the generator determine the maximum field strengths that can be produced by any specific coil.