

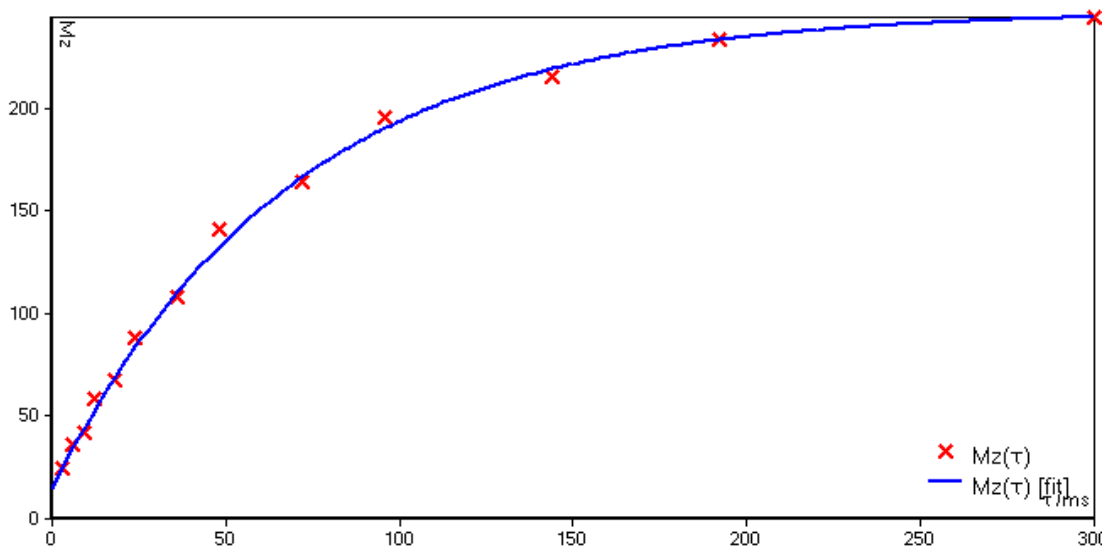
Progressive Saturation T1 Measurements

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Surface area measurements from NMR can be accomplished using either T_1 or T_2 measurements. In some cases, for example with very highly concentrated suspensions, T_2 relaxation times are so short it can be difficult to determine surface area precisely. In those situations, measurements of T_1 relaxation times are more appropriate.

T_1 measurements can be performed in a variety of ways. Perhaps the most efficient approach is to use the **Progressive Saturation** method. Measurement times approach that of T_2 CPMG methods. Using **Progressive Saturation**, T_1 measurements can be acquired in a timescale approximately 50% less than the same experiment performed using the **Inversion Recovery** pulse sequence.

The figure below illustrates progressive saturation method to measure the relaxation time of Glycerol:



$$T_1 = 68.0 \text{ ms} \quad M_Z^\infty = 233 \quad C = 0.063$$

$$\text{Using the equation } M_z = M_Z^\infty \left(1 - \exp\left(-\frac{\tau}{T_1}\right)\right) + C$$

Glycerol 4 scans, $\tau_o = 3\text{ms}$, $40\mu\text{s}$ acquisition window and using multiples of τ_o : 100, 64, 48, 32, 24, 16, 12, 8, 6, 4, 3, 2, 1