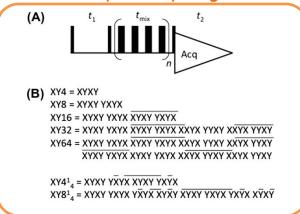
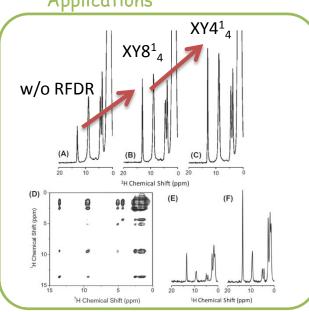
## Efficient <sup>1</sup>H-<sup>1</sup>H magnetization mixing at ultrafast MAS

Homonuclear dipolar interactions should be recoupled to achieve <sup>1</sup>H-<sup>1</sup>H magnetization mixing at ultrafast MAS where the dipolar interactions are largely suppressed. Radio Frequency Driven Recoupling (RFDR) is widely used zero-quantum dipolar recoupling method for <sup>13</sup>C and can be used for <sup>1</sup>H as well. While (XY8)4<sup>1</sup> is the best phase cycling for <sup>13</sup>C, it is not obvious what is the best for <sup>1</sup>H. There is two criteria: 1) better conservation of overall <sup>1</sup>H magnetization and 2) efficient magnetization transfer between <sup>1</sup>Hs. The best is found to be XY4 for low power (~100 kHz) and XY4 $^{1}_{4}$  for high power (~400 kHz).

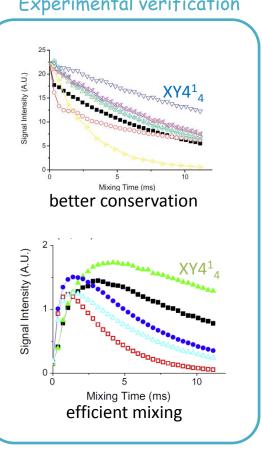
## RFDR phase cyclings.



## Applications



## Experimental verification



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