Supporting Material
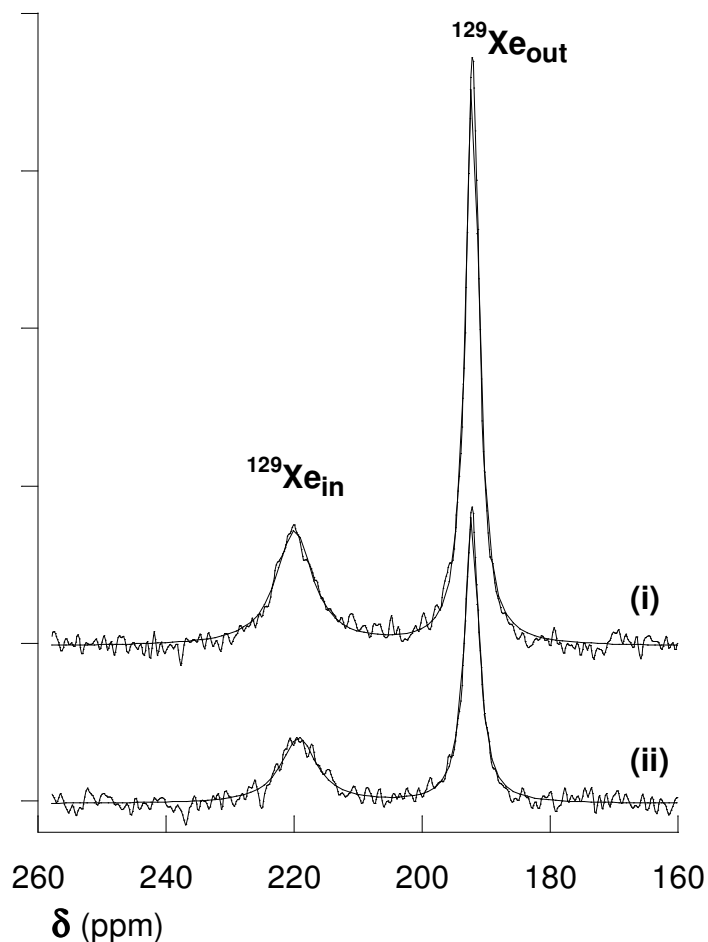
Probing Polymer Colloids by [129]Xe NMR
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Figure S1. NMR spectra of [129]Xe dissolved in the PS colloid recorded at 25°C (i) without and (ii) under continuous broad band ^{1}H irradiation. Latex/D_2O 85/15 v/v; approximately 9 atm of xenon gas. Both spectra were recorded at 9.4 T using identical acquisition parameters and are plotted at the same scale. The smooth lines are the result of spectrum fittings using two Lorenztian functions and a constant non-zero base line. $\Delta\nu_{1/2}$ values corrected for LB ± twice the fitting error (Hz): Xe_{in} (i) 747 ± 36, (ii) 722 ± 60; Xe_{out} (i) 252 ± 4, (ii) 268 ± 8. Integral ratio (ii)/(i) : Xe_{in} 0.55, Xe_{out} 0.53.
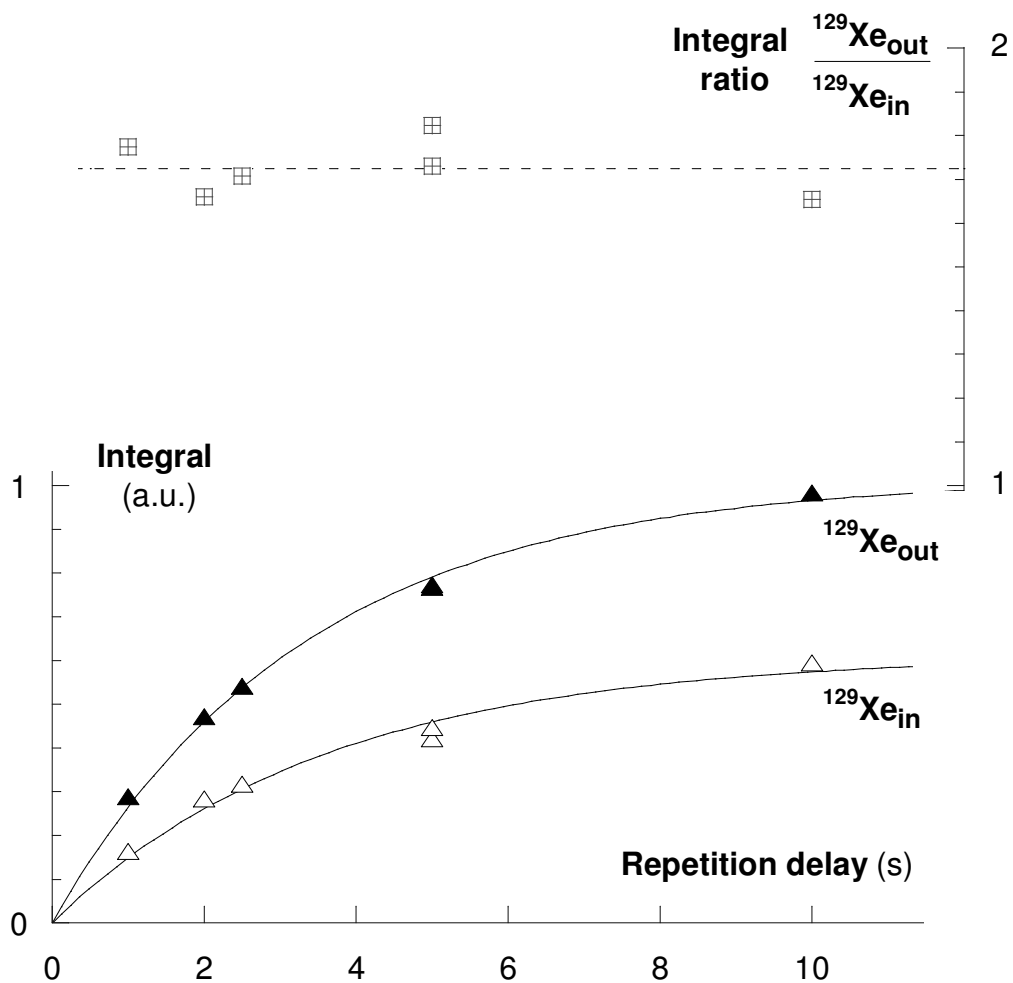
Figure S2. Integrated intensity of the signals of free (out) and sorbed (in) ^{129}Xe, and their ratio, measured at 25°C as a function of the repetition delay for xenon dissolved in the PS colloid. Latex/D_2O 85/15 v/v; approximately 9 atm of xenon gas. The spectra were recorded at 9.4 T using an observation pulse of approximately 30°. The horizontal dashed line shows the average of the integral ratio values (average value = 1.73; standard deviation = 0.07).
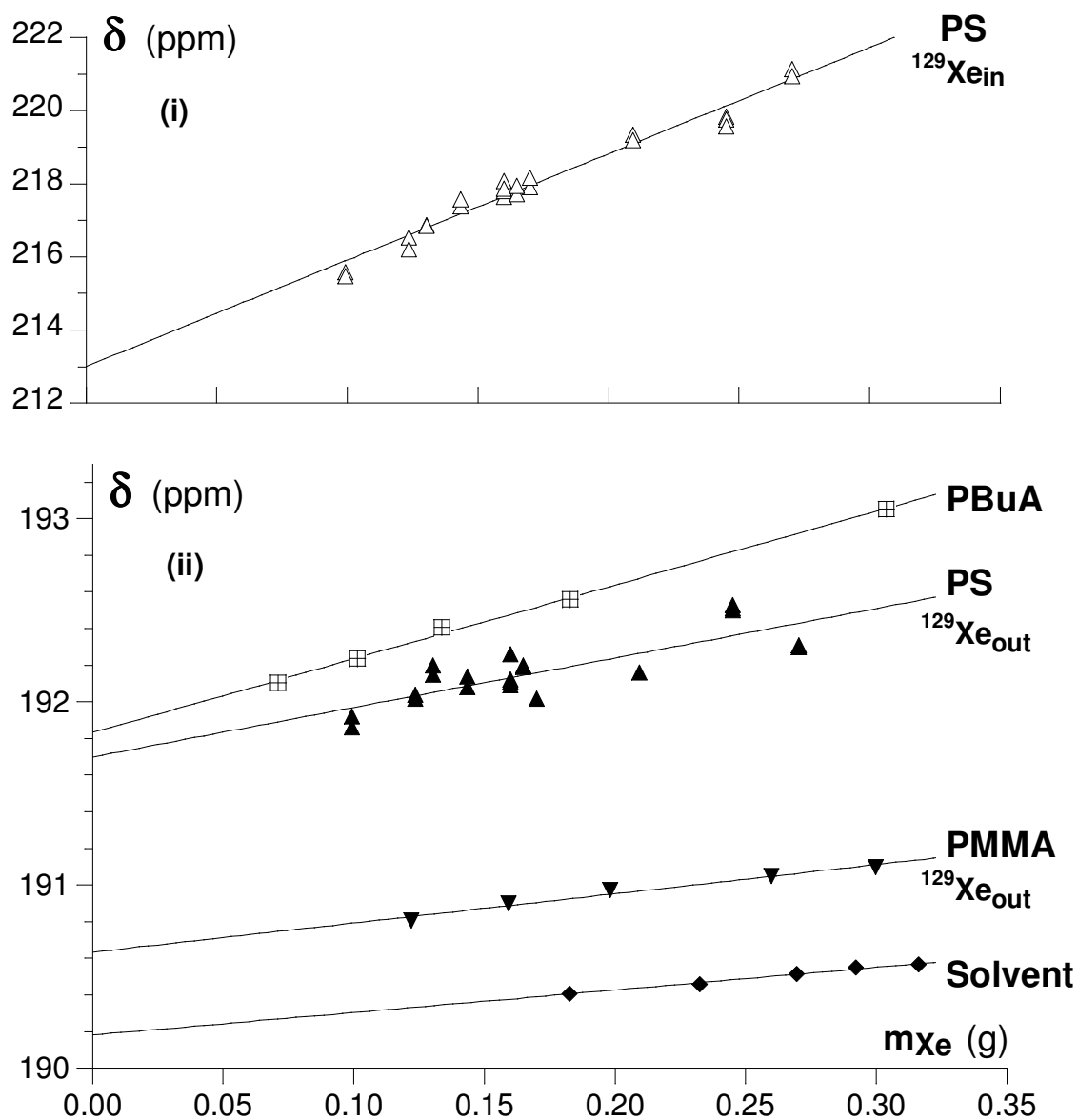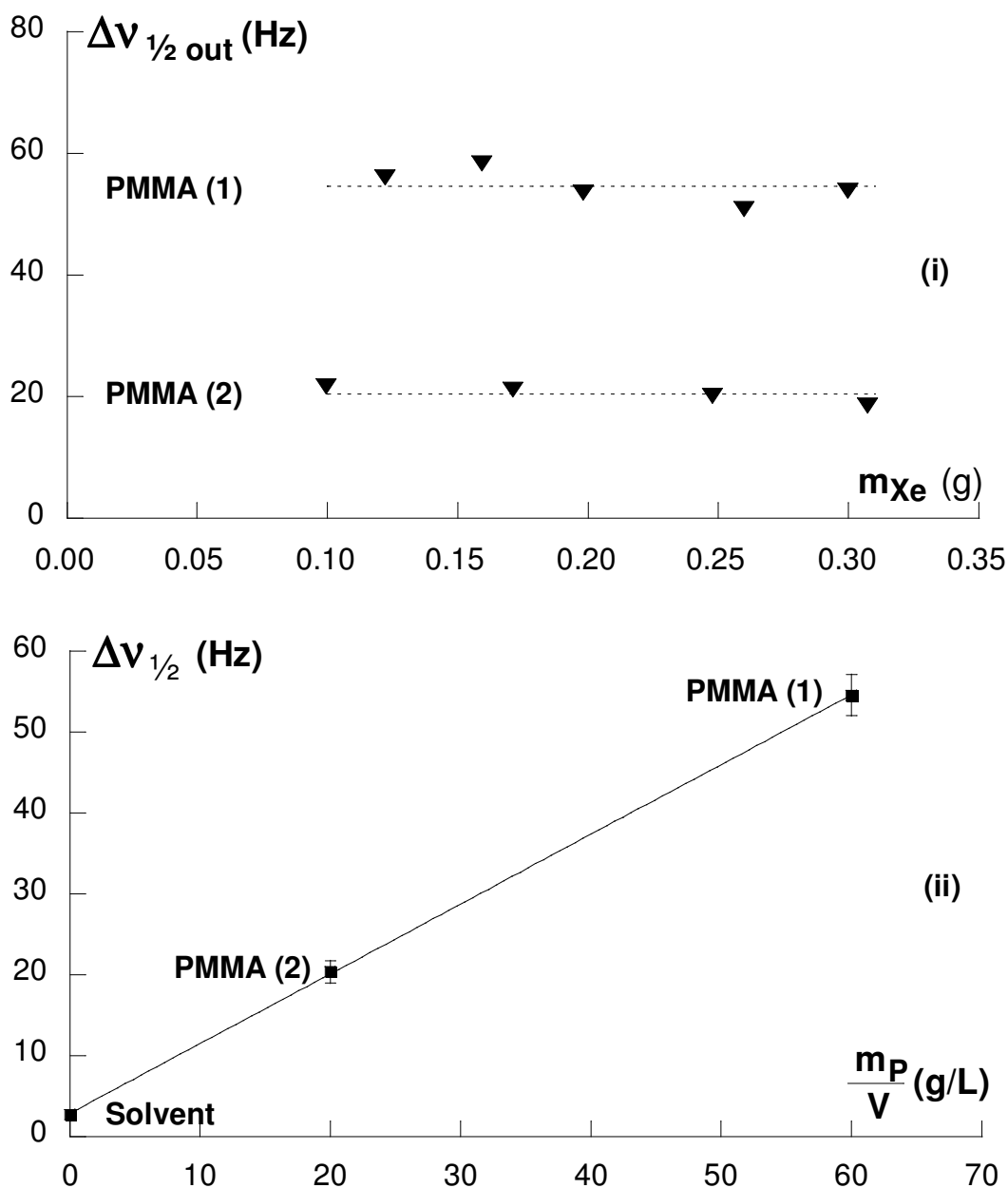
Figure S3. Variation of the ^{129}Xe chemical shift with the mass of xenon gas pressurized in the NMR tube. Latex/D$_2$O 85/15 v/v; Solvent: H$_2$O/D$_2$O 85/15 v/v; 0.3 g of xenon corresponds to a pressure of approximately 10 atm. The spectra were recorded at 8.5 T and 25°C. The vertical scale of parts (i) and (ii) are different by a 5-fold factor.
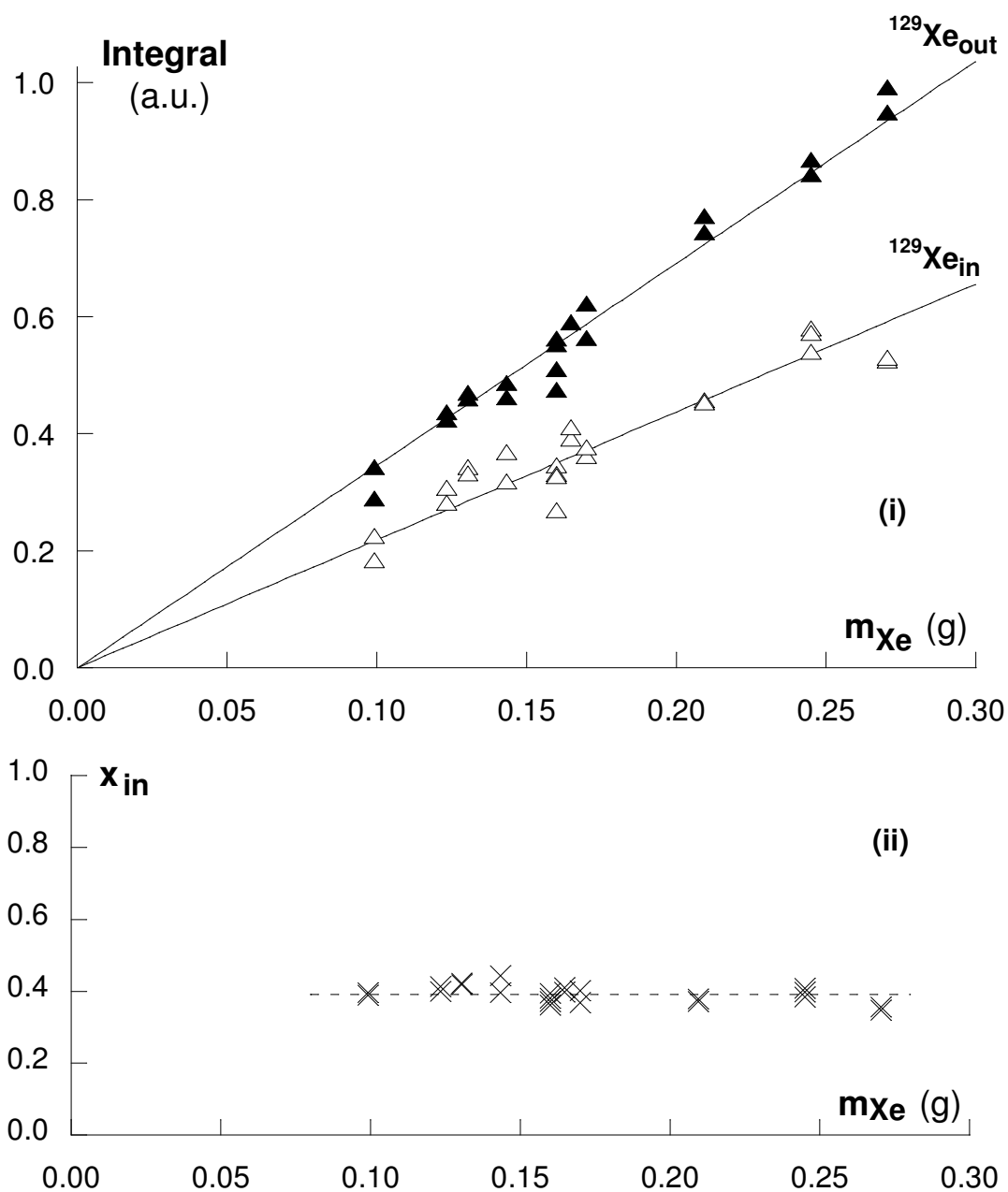
Figure S4. Integrals measured for [129]Xe dissolved in the PS colloid, part (i), and corresponding mole fraction of xenon sorbed in the PS latex particles, part (ii), as a function of the mass of xenon gas pressurized in the NMR tube. Latex/D_2O 85/15 v/v; 0.3 g of xenon corresponds to a pressure of approximately 10 atm. The spectra were recorded at 8.5 T and 25°C. The horizontal dashed line in part (ii) shows the average mole fraction value determined to be 0.39 (standard deviation = 0.02).
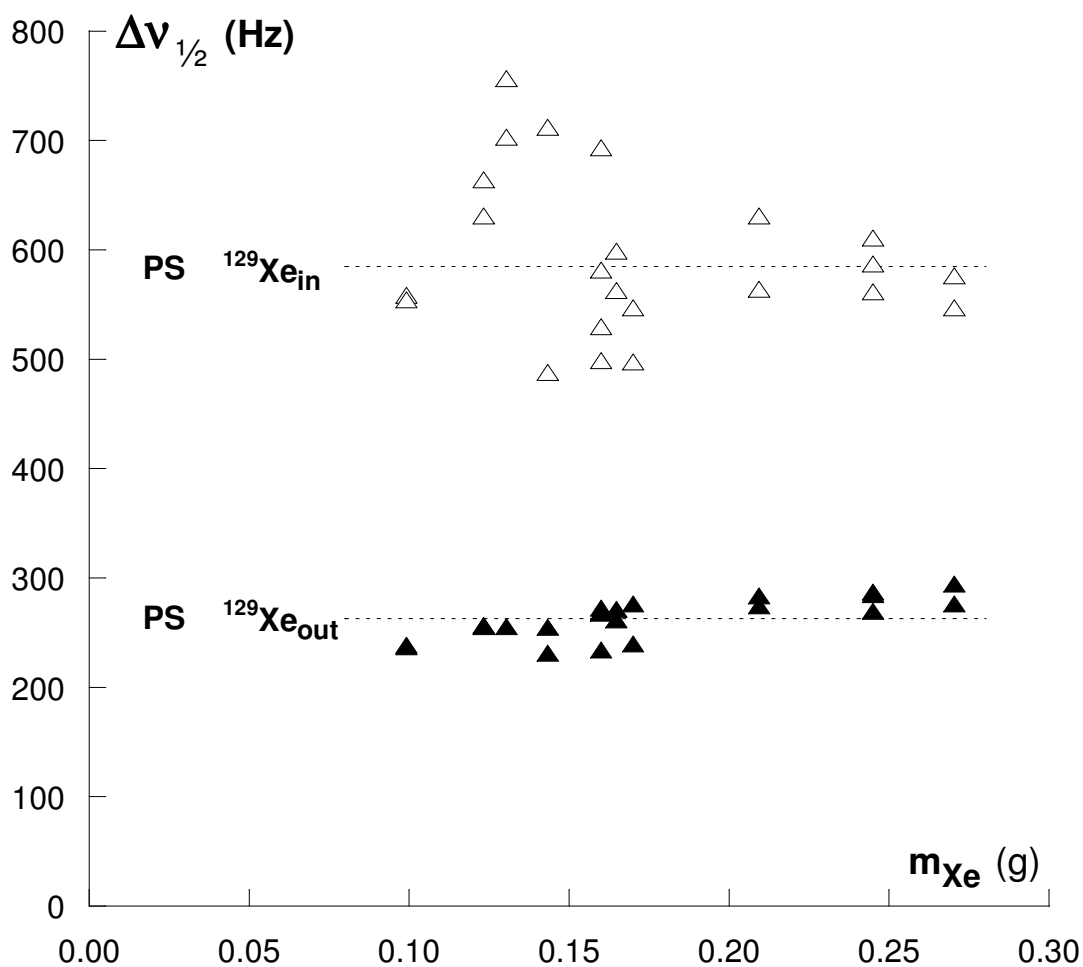
Figure S5. Line widths measured for [129]Xe dissolved in the PS colloid as a function of the mass of xenon gas pressurized in the NMR tube. Latex/D_2O 85/15 v/v; 0.3 g of xenon corresponds to a pressure of approximately 10 atm. The spectra were recorded at 8.5 T and 25°C. The figure shows line width data corrected for LB. The horizontal dashed lines show the average values.
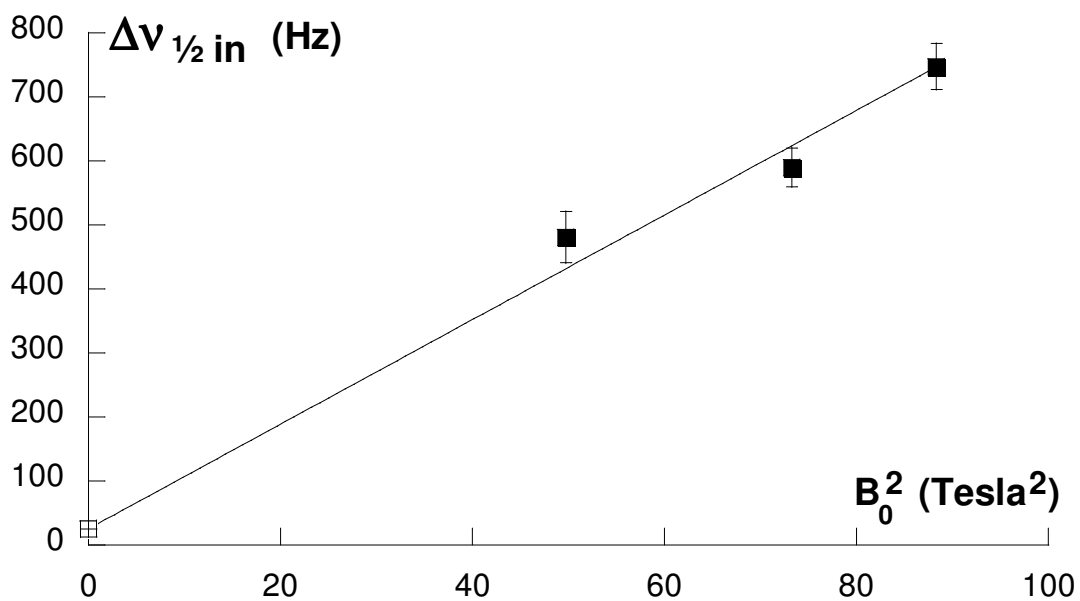
Figure S6. Line width of free [129]Xe observed for the PMMA colloid as a function of the mass of xenon gas pressurized in the NMR tube, part (i), and variation of the average line width value with the mass concentration of PMMA polymer particles, part(ii). (1): Latex/D_2O 85/15 v/v; (2): Latex/H_2O/D_2O 28/57/15 v/v; Solvent: H_2O/D_2O 85/15 v/v. 0.3 g of xenon corresponds to a pressure of approximately 10 atm. The spectra were recorded at 8.5 T and 25°C. Line widths corrected for LB are shown. In part (i), the dashed lines correspond to the average values. In part (ii), the plain line is the best linear fit: ordinate at the origin (2.9 ± 0.5) Hz; slope (0.86 ± 0.01) Hz L g^{-1}; the confidence intervals correspond to twice the fitting errors.

Table S1.

Full Line width at half height of the [129]Xe signals observed at 25°C and various static magnetic fields, B_0, for xenon dissolved in the PS colloid

B_0 (Tesla)	$\Delta v_{\frac{1}{2}\,in}$ (Hz)	$\Delta v_{\frac{1}{2}\,out}$ (Hz)
7.05	480 ± 40	256 ± 9
8.46	590 ± 30	263 ± 8
9.40	750 ± 40	252 ± 4

Latex/D_2O 85/15 v/v; independent samples were used for the measurements at the different magnetic fields. Reported line widths are corrected for LB. The values quoted for B_0 = 8.46 T is the average of 23 values, among which values measured at various xenon pressures (see Figure S5); confidence intervals are twice the standard error. The values quoted for B_0 = 9.40 and B_0 = 7.05 were determined from a spectrum of 20000 transients recorded for a pressure of xenon gas of approximately 9 atm (spectrum shown in Figure 1) and 30000 transients recorded for a pressure of xenon gas of approximately 10 atm, respectively; confidence intervals are twice the error provided by the spectrum fitting.

Figure S7. Line width of sorbed [129]Xe observed at 25°C for the PS colloid at various static magnetic fields. The point at zero field corresponds to the sum of the contributions to the line width of [129]Xe$_{in}$ due to chemical exchange with free xenon, $\Delta v_{\frac{1}{2} \; in}^{in-out} \approx 22$ Hz, and due to instrumental imperfections, $\Delta v_{\frac{1}{2} \; Solvent} \approx 3$ Hz (see text and Table 2).