## **Electronic supplementary information (ESI)**

The high pressure experiments were conducted in a home-made sapphire anvil cell, SAC. The design is based on the original diamond anvil cell, DAC, commonly used in Raman Spectroscopy at high pressures.<sup>1</sup> The device is depicted in Figure S1. As can be seen it consists of two opposing sapphires between the culets (tips) with a sample housed in a gasket made of stainless steel. The sample can be viewed through the sapphires which also allow the acquisition of the Raman spectra.



Fig. S1. Scheme of a home-made sapphire anvil cell, SAC.

For getting the EDA Raman spectra at high pressure a few EDA drops are introduced into the hole of the gasket, and then the SAC is closed. Due to the fact that EDA solidifies at pressure below 0.2 GPa,<sup>2</sup> the sample underwent a solid phase transition a soon as the cell was closed. In Figure S2 and S3 the spectra of the liquid and solid EDA are shown, respectively. The band Raman shifts obtained from the analysis of the second derivative (see top in Fig. 2) along with other published data<sup>3,4</sup> are shown in Table S1 and S2.



**Fig. S2** Raman spectrum liquid ethylenediamine at room temperature At the top of the second derivative spectrum is shown.



**Fig. S3** Raman spectrum acquired for solid ethylenediamine at room temperature and at pressure of about 0.2 GPa. At the top of the second derivative spectrum is shown.

Assignment	Raman	Raman	Raman shift	
ref. 4	shift ref. 3	shift ref. 4	this work	
$\delta_{s}(NCCN)$	473	475	475	
$\gamma_{(wag)as}$ (NH <sub>2</sub> )/ $\delta_{(rock)}$ (CH <sub>2)</sub>	841	838	838	
v <sub>as</sub> (NCCN)	1055	1062	1051	
v <sub>s</sub> (NCCN)	1099	1100	1096	
$\gamma_{(twist)as}$ (NH <sub>2</sub> )	1245	1242	1243	
$\gamma_{(twist)as}$ (CH <sub>2</sub> )	1299	1304	1301	
$\gamma_{(wag)s,as}$ (CH <sub>2</sub> )	1357	1359	1360	
$\delta_{(bend)}(CH_2)$	1455	1458	1456	
$\delta_{(bend)}(NH_2)$	1600	1599	1599	
$v_{s}(CH_{2})$	2858	2852	2860	
$v_{as}(CH_2)$	2917	2925	2938	
$v_{s}(NH_{2})$	3300	3290	3302	
$\nu_{\sf as}(\sf NH_2)$	3360	3355	3368	

**Table S1** Raman shift of liquid EDA and assignments given in ref 4.

Table S2 Raman shift of solid EDA and assignments given in ref 4

Assignment ref. 4	Raman shift ref. 3	Raman shift ref 4	Raman shift this work
$\gamma_{(twist)as,}(CN)$	430	427	427
$\delta_{s}(NCCN)$	470	469	472
$\gamma_{(wag)as}$ (NH <sub>2</sub> )/ $\delta_{(rock)}$ (CH <sub>2)</sub>	891	892	919
$v_{s}(CH_{2-}CH_{2})$	1054	1054	1057
v <sub>s</sub> (CN)	1109	1109	1127
$\gamma_{(twist)as}$ (CH <sub>2</sub> )	1347	1347	1353
$\gamma_{(wag)s}$ (CH <sub>2</sub> )	1367	1368	1373
$\delta_{(bend)}$ (CH <sub>2</sub> )	1439	1439	1443
$\delta_{\text{(bend)}}(CH_2)$	1450	1450	1464
$\delta_{\text{(bend)}}(\text{NH}_2)$	1624	1623	1632
$v_s(CH_2)$	2856	2858	2825
$v_{as}(CH_2)$	2909	2910	2925
$v_{s}(NH_{2})$	3169	3170	3171
$v_{as}(NH_2)$	3335	3335	3326

Selected high pressure spectra collected at room temperature up to 0.72 GPa, are shown in Figure S4. The estimation of the pressure within the SAC have been performed by analyzing the shift of the antisymmetric CH stretching band as a function of pressure; being that the behaviour of this band with pressure had been previously studied by our group<sup>5</sup> and others authors,<sup>6,7</sup> and it is shown that this band shift about 12 cm<sup>-1</sup> per GPa.



Fig. S4. Selected high pressure spectra of EDA at room temperature.

The behaviour of the  $v_s(CH_2)$  and  $v_{as}(NH_2)$  bands with pressure is shown in Figure S5 and S6 respectively.



Fig. S5. a) Raman band of the of the  $v_s(CH_2)$ , b) and its Raman shift as a function of pressure.



Fig. S6. a) Raman band of the of the  $v_{as}(NH_2)$ , b) and its Raman shift as a function of pressure.

Pressure coefficients are usually described in terms of the so-called mode Grüneisen parameters ( $\gamma_j$ ) using the relation:<sup>8</sup>

$$\gamma_j = \left(\frac{dlnv_j}{dV}\right)_T = B_T \left(\frac{dv_j}{dp}\right)_T$$

Where the subscript j stands for a given bond, v is the frequency of the mode considered, V is the volume,  $B_T$  is the isothermal compressibility and p is the pressure.

In this work, we have studied the effect of the intermolecular interactions trough the analysis of the bonds CH and NH bonds. These bonds are considered "strong covalent bonds" and their reported Grüneisen parameters have values closely to 1 which implies that more than 10 Gpa are required to significant modify the pressure coefficients, and therefore the assumption to consider  $\gamma_j$  constants in the pressure ranges (*i.e.* those exerted by water ) is well supported.

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