Electronic Supporting Information (ESI) for

# $Eu_2Pt_3Pb_5$ and $SrPt_2Pb_4$ — lead-based intermetallics with $Y_2Rh_3Sn_5$ / $NdRh_2Sn_4$-type polyanionic platinum-lead 3D frameworks

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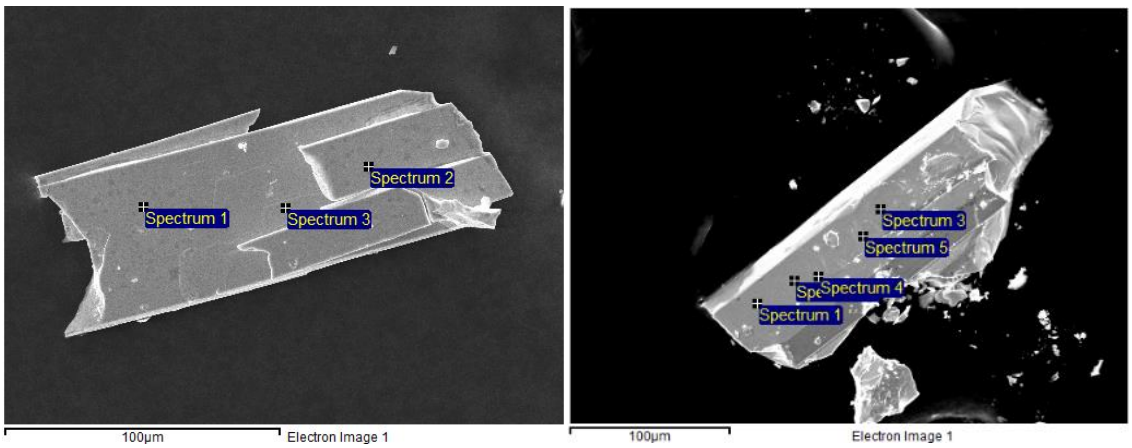


**Figure S1.** SEM image of the $Eu_2Pt_3Pb_5$ (left) and $SrPt_2Pb_4$ (right) crystals with analysis points marked.

**Table S1.** Averaged results of the EDX analysis of the $Eu_2Pt_3Pb_5$ and $SrPt_2Pb_4$ crystals.

| System | Element | measument by *ED*-spectrometer (atomic %) | | | | Average formula |
|---|---|---|---|---|---|---|
| | | Mean | Std. deviation | Max. | Min. | |
| Eu-Pt-Pb | Eu | 20.03 | 0.92 | 20.87 | 18.70 | $Eu_{2.00(9)}Pt_{2.99(5)}P_{5.00(7)}$ |
| | Pt | 29.93 | 0.50 | 30.43 | 29.13 | |
| | Pb | 50.05 | 0.74 | 50.97 | 48.97 | |
| Sr-Pt-Pb | Sr | 14.99 | 0.31 | 15.24 | 14.23 | $Sr_{1.00(2)}Pt_{2.01(3)}P_{3.65(3)}$ |
| | Pt | 30.25 | 0.48 | 31.22 | 29.63 | |
| | Pb | 54.76 | 0.44 | 54.05 | 55.49 | |

**Table S2**. Anisotropic displacement parameters for $Eu_2Pt_3Pb_5$ and $SrPt_2Pb_4$.

| **$Eu_2Pt_3Pb_5$** | | | | | | |
|---|---|---|---|---|---|---|
| ***Atom*** | ***$U_{11}$*** | ***$U_{22}$*** | ***$U_{33}$*** | ***$U_{12}$*** | ***$U_{13}$*** | ***$U_{23}$*** |
| Pt1 | 0.0095(10) | 0.0060(9) | 0.0133(11) | 0.0005(7) | 0.0000 | 0.0000 |
| Pt2 | 0.0081(8) | 0.0042(8) | 0.0157(10) | -0.0012(8) | 0.0000 | 0.0000 |
| Pt3 | 0.0093(10) | 0.0051(8) | 0.0148(10) | -0.0004(7) | 0.0000 | 0.0000 |
| Eu1 | 0.0102(10) | 0.0055(10) | 0.0147(12) | -0.0004(10) | 0.0000 | 0.0000 |
| Eu2 | 0.0085(11) | 0.0051(10) | 0.0144(14) | -0.0030(9) | 0.0000 | 0.0000 |
| Pb1 | 0.0082(10) | 0.0036(9) | 0.0149(9) | -0.0005(7) | 0.0000 | 0.0000 |
| Pb2 | 0.0122(10) | 0.0077(9) | 0.0161(9) | -0.0001(7) | 0.0000 | 0.0000 |
| Pb3 | 0.0086(9) | 0.0038(8) | 0.0157(10) | 0.0005(6) | 0.0000 | 0.0000 |
| Pb4 | 0.0118(9) | 0.0033(7) | 0.0143(11) | -0.0007(7) | 0.0000 | 0.0000 |
| Pb5 | 0.0088(9) | 0.0051(8) | 0.0128(9) | 0.0004(6) | 0.0000 | 0.0000 |
| **$SrPt_2Pb_4$** | | | | | | |

| *Atom* | $U_{11}$ | $U_{22}$ | $U_{33}$ | $U_{12}$ | $U_{13}$ | $U_{23}$ |
|---|---|---|---|---|---|---|
| Pb1 | 0.0149(6) | 0.0141(6) | 0.0078(6) | 0.0000 | 0.0003(5) | 0.0000 |
| Pb2 | 0.0135(6) | 0.0150(6) | 0.0097(6) | 0.0000 | 0.0004(5) | 0.0000 |
| Pb3 | 0.0146(6) | 0.0142(6) | 0.0084(6) | 0.0000 | 0.0007(5) | 0.0000 |
| Pb4 | 0.0195(7) | 0.0215(7) | 0.0156(7) | 0.0000 | 0.0004(5) | 0.0000 |
| Pt1 | 0.0204(7) | 0.0145(6) | 0.0098(7) | 0.0000 | -0.0011(5) | 0.0000 |
| Pt2 | 0.0196(7) | 0.0153(6) | 0.0110(7) | 0.0000 | -0.0016(5) | 0.0000 |
| Sr | 0.0125(15) | 0.0126(14) | 0.0097(14) | 0.0000 | 0.0028(12) | 0.0000 |

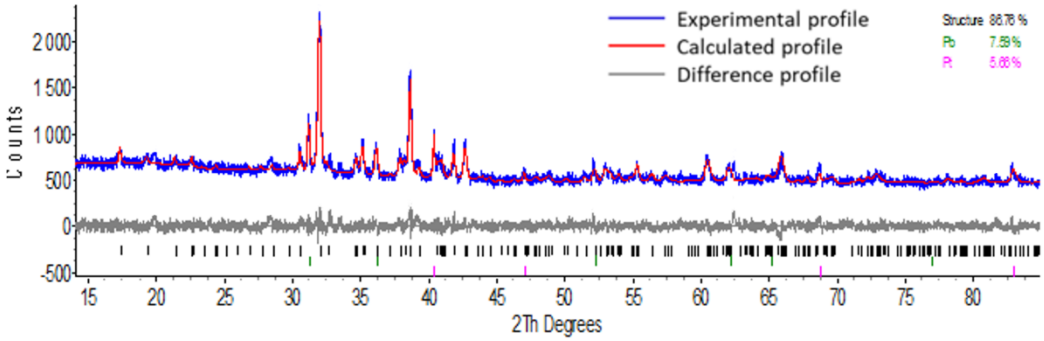


**Figure S2.** Observed, calculated, and difference Rietveld plots for the sample $Eu_2Pt_3Pb_5$.

**Table S3**. Data collection and Rietveld analysis parameters, and final residuals for $Eu_2Pt_3Pb_5$

| Compound | $Eu_2Pt_3Pb_5$ |
|---|---|
| T, K | 293 |
| Space group | $Cmc2_1$ |
| *a*, Å | 4.6430(9) |
| *b*, Å | 27.204(5) |
| *c*, Å | 7.562(2) |
| V, Å$^3$ | 962.1(3) |
| *Z* | 4 |
| Range in 2θ, ° | 15-85 |
| ρ, g cm$^{-3}$ | 13.291(5) |
| $R_{Bragg}$ | 0.022 |
| $R_p$ | 0.046 |
| $R_{wp}$ | 0.060 |
| GoF | 1.45 |

**Table S4.** Fractional atomic coordinates and isotropic displacement parameters for $Eu_2Pt_3Pb_5$ (polycrystalline sample).

| Atom | Wickoff site | x/a | y/b | z/c | $B_{eq}$ |
|---|---|---|---|---|---|
| Pt1 | 4a | 0.5 | 0.5439(7) | 1 | 0.75(1) |
| Pb1 | 4a | 0 | 0.7139(6) | 0 | 0.702(7) |
| Eu1 | 4a | 0.5 | 0.6699(8) | 1 | 0.805(5) |
| Eu2 | 4a | 1 | 0.5195(6) | 0 | 0.742(7) |
| Pb2 | 4a | 1 | 0.7009(5) | 0 | 0.955(8) |
| Pb3 | 4a | 0.5 | 0.4524(7) | 1 | 0.734(8) |
| Pt2 | 4a | 0.5 | 0.7169(5) | 0 | 0.734(8) |
| Pb4 | 4a | 0.5 | 0.6174(4) | 0 | 0.765(9) |
| Pt3 | 4a | 1 | 0.6012(6) | 0 | 0.773(8) |
| Pb5 | 4a | 1 | 0.6001(6) | 1 | 0.710(6) |

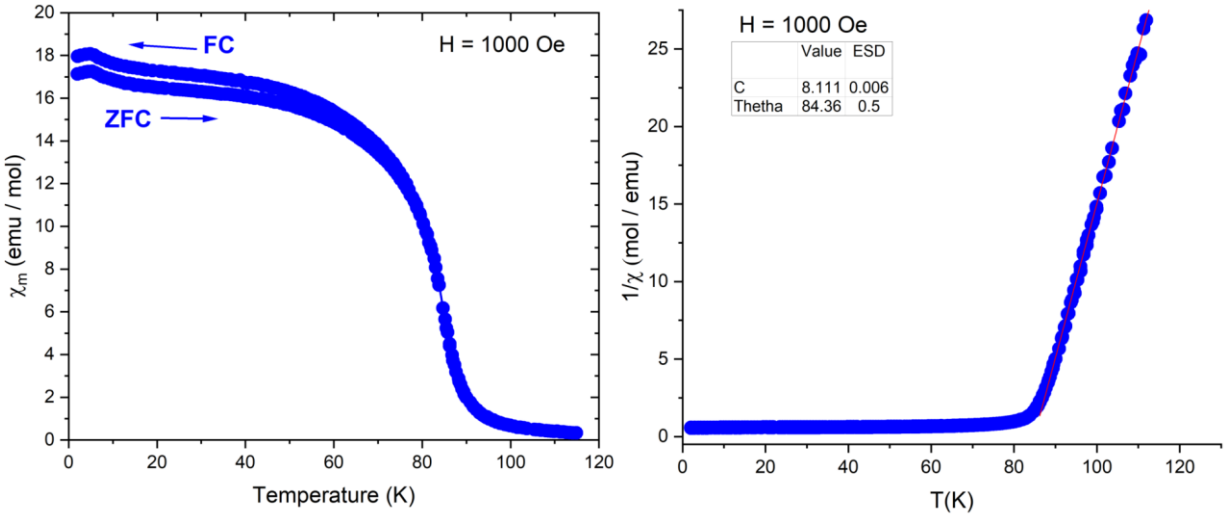


**Figure S3.** The temperature dependences of molar magnetic susceptibility (left) of $Eu_2Pt_3Pb_5$ and inverse magnetic susceptibility (right) in the magnetic field of 1000 Oe. The parameters of the Curie-Weiss fit are plotted in the inset table in the inverse magnetization plot.