**Table S1.** Physical and chemical properties and the content of chemical elements in the solutions of interaction between shot and atmospheric precipitation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solution No. | Steel shot1 | | | | | A mixture of steel and lead shot2 | | | | | | | | Lead shot1 | | | | |
| pH | σ, µS/cm | Fe, ppm | | | pH | σ, µS/cm | Fe, ppm | | | Pb, ppm | | | pH | σ, µS/cm | Pb, ppm | | |
| *a* | *b* | *c* | *a* | *b* | *c* | *a* | *b* | *c* | *a* | *b* | *c* |
| *initial* | *6.1±0.2* | *27±3* | *<0.01* | | | *6.1±0.2* | *27±3* | *<0.01* | | | *<0.01* | | | *6.1±0.2* | *27±3* | *<0.01* | | |
| 1 | 7.4 | 58 | 2.82 | 4.12 | 6.94 | 6.9 | 43 | 1.00 | 9.19 | 10.2 | 0.38 | 1.99 | 2.4 | 6.6 | 31 | 1.00 | 0.23 | 1.23 |
| 2 | 7.0 | 29 | 6.36 | 8.14 | 14.5 | 7.1 | 28 | 1.54 | 10.1 | 11.6 | 0.19 | 1.16 | 1.4 | 6.3 | 29 | 1.22 | 0.21 | 1.44 |
| 3 | 7.0 | 30 | <0.01 | 49.4 | 49.4 | 7.0 | 30 | 0.03 | 31.5 | 31.5 | 0.20 | 1.54 | 1.7 | 6.9 | 26 | 1.48 | 0.13 | 1.61 |
| 4 | 7.1 | 30 | 0.05 | 66.4 | 66.5 | 6.5 | 29 | <0.01 | 51.2 | 51.2 | 0.19 | 5.33 | 5.5 | 6.8 | 27 | 1.03 | 0.13 | 1.16 |
| 5 | 6.8 | 30 | <0.01 | 80.0 | 80.0 | 7.0 | 29 | 0.03 | 84.5 | 84.6 | 0.29 | 15.4 | 15.6 | 6.5 | 26 | 0.82 | 0.31 | 1.12 |
| 6 | 7.1 | 28 | 0.02 | 65.7 | 65.7 | 6.8 | 28 | 0.03 | 44.8 | 44.8 | 0.29 | 9.05 | 9.34 | 6.8 | 26 | 0.94 | 0.25 | 1.19 |
| 7 | 6.8 | 27 | 0.03 | 69.1 | 69.2 | 6.6 | 29 | <0.01 | 66.0 | 66.0 | 0.20 | 15.2 | 15.4 | 6.4 | 26 | 0.65 | 0.30 | 0.95 |
| 8 | 6.6 | 27 | 0.02 | 56.6 | 56.6 | 6.8 | 28 | <0.01 | 39.8 | 39.8 | 0.24 | 11.3 | 11.5 | 6.6 | 24 | 1.20 | 1.61 | 2.81 |
| 9 | 6.7 | 26 | 0.05 | 75.9 | 75.9 | 6.9 | 27 | 0.05 | 61.5 | 61.5 | 0.19 | 17.0 | 17.2 | 6.6 | 22 | 1.20 | 2.10 | 3.30 |
| 10 | 6.8 | 25 | <0.01 | 61.5 | 61.5 | 6.6 | 28 | 0.01 | 59.3 | 59.3 | 0.22 | 12.1 | 12.3 | 6.6 | 22 | 1.21 | 2.31 | 3.52 |
| 11 | 6.9 | 27 | <0.01 | 61.1 | 61.1 | 6.8 | 25 | 0.01 | 61.2 | 61.2 | 0.21 | 11.3 | 11.5 | 6.6 | 23 | 0.77 | 2.50 | 3.27 |
| 12 | 6.8 | 27 | 0.02 | 50.8 | 50.8 | 6.8 | 26 | 0.03 | 45.8 | 45.8 | 0.19 | 13.4 | 13.6 | 6.6 | 23 | 1.08 | 2.13 | 3.20 |
| 13 | 6.8 | 26 | 0.03 | 70.6 | 70.7 | 6.9 | 22 | <0.01 | 38.5 | 38.5 | 0.24 | 21.0 | 21.2 | 6.6 | 22 | 1.29 | 1.89 | 3.18 |
| 14 | 6.8 | 21 | <0.01 | 49.5 | 49.5 | 6.7 | 22 | 0.03 | 37.0 | 37.0 | 0.24 | 27.7 | 28.0 | 6.7 | 26 | 1.10 | 2.34 | 3.45 |
| 15 | 6.5 | 20 | <0.01 | 75.9 | 75.9 | 6.6 | 22 | 0.03 | 65.0 | 65.0 | 0.25 | 30.1 | 30.4 | 6.4 | 26 | 0.78 | 2.51 | 3.29 |
| 16 | 6.5 | 25 | 0.02 | 46.1 | 46.1 | 6.6 | 22 | 0.01 | 37.8 | 37.9 | 0.24 | 5.70 | 5.94 | 6.6 | 25 | 1.27 | 3.80 | 5.07 |
| 17 | 6.5 | 21 | 0.01 | 59.4 | 59.4 | 6.4 | 23 | 0.03 | 49.6 | 49.7 | 0.17 | 5.02 | 5.19 | 6.9 | 26 | 1.26 | 0.84 | 2.09 |
| 18 | 7.0 | 26 | 0.01 | 47.1 | 47.1 | 6.6 | 24 | <0.01 | 40.2 | 40.2 | 0.17 | 3.17 | 3.33 | 6.8 | 25 | 1.13 | 0.85 | 1.98 |
| 19 | 6.4 | 23 | <0.01 | 53.8 | 53.8 | 6.7 | 23 | 0.02 | 41.5 | 41.5 | 0.15 | 2.45 | 2.60 | 6.8 | 24 | 0.89 | 1.17 | 2.05 |
| 20 | 6.5 | 23 | 0.01 | 56.9 | 56.9 | 6.6 | 21 | 0.02 | 36.2 | 36.2 | 0.10 | 1.56 | 1.67 | 6.7 | 24 | 1.14 | 1.07 | 2.22 |
| 21 | 6.6 | 21 | <0.01 | 62.7 | 62.7 | 6.5 | 24 | 0.01 | 59.5 | 59.5 | 0.11 | 2.86 | 2.97 | 6.7 | 25 | 0.86 | 0.88 | 1.75 |
| 22 | 6.5 | 20 | <0.01 | 60.0 | 60.0 | 6.7 | 21 | 0.01 | 60.4 | 60.4 | 0.12 | 3.11 | 3.23 | 6.7 | 23 | 0.62 | 0.55 | 1.17 |
| 23 | 6.8 | 26 | 0.02 | 58.1 | 58.2 | 6.9 | 31 | 0.03 | 48.5 | 48.6 | 0.05 | 1.79 | 1.85 | 6.7 | 27 | 0.73 | 0.75 | 1.49 |
| 24 | 6.7 | 23 | <0.01 | 56.6 | 56.6 | 6.9 | 28 | <0.01 | 48.0 | 48.0 | 0.04 | 1.96 | 2.00 | 6.7 | 27 | 0.86 | 0.85 | 1.72 |
| 25 | 6.9 | 25 | <0.01 | 63.6 | 63.6 | 6.7 | 28 | <0.01 | 53.6 | 53.6 | 0.06 | 2.65 | 2.71 | 6.8 | 25 | 1.00 | 0.96 | 1.95 |

1 5 g of shot, 100 ml of a solution; 2 2.5 g of each type of shot, 100 ml of a solution; *a* – dissolved forms, *b* – suspended forms, *c* – total content

**Table S2.** Physical and chemical properties and the content of chemical elements in the solutions of interaction between shot and acid precipitation

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solution No. | Steel shot1 | | | | | A mixture of steel and lead shot2 | | | | | | | | Lead shot1 | | | | |
| pH | σ, µS/cm | Fe, ppm | | | pH | σ, µS/cm | Fe, ppm | | | Pb, ppm | | | pH | σ, µS/cm | Pb, ppm | | |
| a | b | c | a | b | c | a | b | c | a | b | c |
| *initial* | *4.0±0.1* | *30±2* | *<0.01* | | | *4.0±0.1* | *30±2* | *<0.01* | | | *<0.01* | | | *4.0±0.1* | *30±2* | *<0.01* | | |
| 1 | 6.8 | 67 | 0.78 | 1.82 | 2.59 | 6.1 | 30 | 0.01 | 2.60 | 2.61 | 1.83 | 4.66 | 6.49 | 5.2 | 43 | 2.32 | 24.3 | 26.6 |
| 2 | 6.3 | 13 | 0.84 | 21.4 | 22.3 | 5.8 | 13 | 0.04 | 12.1 | 12.2 | 2.00 | 6.48 | 8.48 | 5.9 | 10 | 2.91 | 26.4 | 29.4 |
| 3 | 6.2 | 13 | 0.77 | 61.5 | 62.3 | 5.6 | 13 | 0.04 | 43.1 | 43.1 | 2.50 | 11.2 | 13.7 | 5.8 | 14 | 3.94 | 12.4 | 16.3 |
| 4 | 5.6 | 14 | 0.60 | 73.4 | 74.0 | 5.8 | 14 | 0.10 | 45.6 | 45.7 | 1.75 | 26.6 | 28.3 | 5.8 | 12 | 3.43 | 3.88 | 7.31 |
| 5 | 5.4 | 14 | 0.40 | 86.2 | 86.6 | 6.2 | 13 | <0.01 | 56.0 | 56.0 | 0.90 | 33.4 | 34.3 | 5.2 | 13 | 3.15 | 1.83 | 4.98 |
| 6 | 6.0 | 12 | 0.38 | 53.4 | 53.8 | 5.7 | 13 | <0.01 | 38.2 | 38.2 | 1.06 | 28.5 | 29.6 | 5.8 | 11 | 5.46 | 0.57 | 6.03 |
| 7 | 5.8 | 12 | 0.40 | 70.7 | 71.1 | 5.6 | 10 | 0.06 | 85.0 | 85.1 | 0.40 | 41.3 | 41.7 | 5.7 | 12 | 7.15 | 0.78 | 7.93 |
| 8 | 5.8 | 13 | 0.74 | 47.4 | 48.2 | 5.8 | 16 | 0.10 | 42.0 | 42.1 | 1.53 | 28.9 | 30.4 | 5.3 | 15 | 4.68 | 0.41 | 5.09 |
| 9 | 5.8 | 11 | 0.50 | 77.3 | 77.8 | 6.2 | 12 | 0.11 | 67.3 | 67.5 | 0.58 | 44.6 | 45.2 | 5.3 | 13 | 5.51 | 0.23 | 5.74 |
| 10 | 5.5 | 13 | 0.72 | 65.1 | 65.9 | 6.0 | 11 | <0.01 | 48.8 | 48.8 | 1.19 | 26.6 | 27.8 | 5.3 | 12 | 5.25 | 0.32 | 5.57 |
| 11 | 5.8 | 13 | 0.58 | 55.1 | 55.7 | 6.5 | 13 | 0.01 | 40.8 | 40.8 | 0.99 | 17.9 | 18.9 | 5.2 | 17 | 7.30 | 0.36 | 7.66 |
| 12 | 5.6 | 13 | 0.77 | 50.0 | 50.8 | 6.0 | 12 | 0.11 | 44.8 | 44.9 | 0.90 | 11.3 | 12.2 | 5.3 | 17 | 5.60 | 0.29 | 5.89 |
| 13 | 5.7 | 12 | 0.66 | 52.4 | 53.0 | 5.6 | 12 | 0.10 | 60.5 | 60.6 | 0.87 | 10.7 | 11.6 | 5.6 | 15 | 5.67 | 0.31 | 5.98 |
| 14 | 5.8 | 13 | 0.56 | 54.7 | 55.3 | 6.1 | 11 | 0.01 | 36.9 | 36.9 | 0.83 | 4.59 | 5.42 | 5.1 | 14 | 4.62 | 0.38 | 5.00 |
| 15 | 5.3 | 15 | 0.36 | 80.5 | 80.9 | 6.1 | 11 | <0.01 | 57.2 | 57.2 | 0.55 | 4.42 | 4.97 | 5.5 | 17 | 5.98 | 0.31 | 6.28 |
| 16 | 5.8 | 13 | 0.44 | 48.2 | 48.6 | 6.0 | 11 | 0.08 | 40.1 | 40.2 | 0.39 | 2.77 | 3.17 | 5.5 | 14 | 7.63 | 0.27 | 7.90 |
| 17 | 5.6 | 12 | 0.39 | 65.4 | 65.8 | 5.8 | 10 | 0.05 | 62.7 | 62.7 | 0.65 | 3.72 | 4.37 | 5.8 | 17 | 5.90 | 0.19 | 6.09 |
| 18 | 5.9 | 13 | 0.56 | 50.4 | 51.0 | 6.3 | 10 | <0.01 | 52.5 | 52.5 | 0.58 | 3.57 | 4.15 | 5.5 | 17 | 5.09 | 0.19 | 5.28 |
| 19 | 5.4 | 13 | 0.48 | 57.7 | 58.1 | 5.5 | 13 | 0.07 | 51.6 | 51.7 | 0.59 | 3.71 | 4.30 | 5.8 | 17 | 4.83 | 0.22 | 5.05 |
| 20 | 5.5 | 14 | 0.51 | 63.3 | 63.8 | 6.2 | 12 | 0.05 | 60.8 | 60.9 | 0.90 | 5.09 | 5.99 | 5.5 | 16 | 5.91 | 0.18 | 6.10 |
| 21 | 5.4 | 18 | 0.44 | 71.8 | 72.3 | 6.0 | 10 | 0.06 | 50.9 | 51.0 | 0.96 | 4.98 | 5.94 | 5.7 | 16 | 5.19 | 0.20 | 5.39 |
| 22 | 5.8 | 13 | 0.37 | 62.2 | 62.6 | 6.3 | 13 | 0.06 | 65.0 | 65.1 | 1.13 | 6.31 | 7.44 | 5.8 | 17 | 5.55 | 0.14 | 5.68 |
| 23 | 6.1 | 16 | 0.45 | 50.8 | 51.2 | 6.4 | 13 | 0.04 | 42.1 | 42.1 | 0.99 | 3.94 | 4.94 | 5.6 | 14 | 5.77 | 0.18 | 5.94 |
| 24 | 5.9 | 11 | 0.46 | 47.5 | 47.9 | 6.3 | 12 | 0.08 | 50.5 | 50.6 | 0.91 | 4.51 | 5.42 | 5.7 | 17 | 5.68 | 0.20 | 5.88 |
| 25 | 5.8 | 13 | 0.51 | 48.4 | 48.9 | 6.2 | 12 | 0.06 | 55.2 | 55.3 | 1.15 | 7.02 | 8.17 | 5.8 | 15 | 5.59 | 0.22 | 5.81 |

1 5 g of shot, 100 ml of a solution; 2 2.5 g of each type of shot, 100 ml of a solution; *a* – dissolved forms, *b* – suspended forms, *c* – total content

**Table S3.** Physical and chemical properties and the content of chemical elements in the solutions of interaction between shot and model soil solutions

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Solution No. | Steel shot1 | | | | | A mixture of steel and lead shot2 | | | | | | | | Lead shot1 | | | | |
| pH | σ, µS/cm | Fe, ppm | | | pH | σ, µS/cm | Fe, ppm | | | Pb, ppm | | | pH | σ, µS/cm | Pb, ppm | | |
| a | b | c | a | b | c | a | b | c | a | b | c |
| *initial* | *4.8±0.1* | *4500±100* | *<0.01* | | | *4.8±0.1* | *4500±100* | *<0.01* | | | *<0.01* | | | *4.8±0.1* | *4500±100* | *<0.01* | | |
| 1 | 4.2 | 3380 | 129 | 0.36 | 129 | 4.4 | 3550 | 340 | 1.58 | 341 | 12.6 | 0.13 | 12.7 | 4.5 | 3640 | 219 | 0.43 | 219 |
| 2 | 4.9 | 4420 | 469 | 29.4 | 498 | 4.9 | 4190 | 364 | 6.96 | 371 | 10.8 | 0.20 | 11.0 | 4.4 | 3620 | 290 | 0.44 | 290 |
| 3 | 4.9 | 4430 | 511 | 374 | 885 | 4.8 | 4450 | 548 | 52.8 | 600 | 12.1 | 0.85 | 12.9 | 4.7 | 4470 | 258 | 0.42 | 258 |
| 4 | 4.9 | 4540 | 458 | 277 | 735 | 4.7 | 4280 | 388 | 80.3 | 468 | 12.6 | 1.48 | 14.1 | 4.7 | 4540 | 320 | 1.61 | 322 |
| 5 | 4.8 | 4600 | 480 | 308 | 787 | 4.9 | 4410 | 344 | 80.1 | 424 | 9.24 | 0.59 | 9.83 | 4.6 | 4540 | 220 | 0.41 | 220 |
| 6 | 4.8 | 4370 | 320 | 134 | 454 | 4.8 | 4370 | 295 | 66.7 | 361 | 10.5 | 0.10 | 10.6 | 4.6 | 4440 | 192 | 0.46 | 193 |
| 7 | 4.7 | 4480 | 359 | 215 | 574 | 4.8 | 4410 | 315 | 92.1 | 407 | 8.56 | 0.84 | 9.40 | 4.6 | 4480 | 217 | 0.66 | 217 |
| 8 | 4.9 | 4720 | 386 | 122 | 507 | 4.8 | 4680 | 281 | 67.1 | 348 | 11.0 | 0.29 | 11.3 | 4.6 | 4520 | 241 | 0.29 | 241 |
| 9 | 5.0 | 4750 | 441 | 245 | 686 | 4.9 | 4900 | 324 | 97.4 | 422 | 11.4 | 1.13 | 12.6 | 4.8 | 4490 | 206 | 0.76 | 206 |
| 10 | 4.9 | 4860 | 385 | 161 | 546 | 4.8 | 4780 | 298 | 77.6 | 376 | 12.8 | 0.68 | 13.5 | 4.8 | 4470 | 290 | 0.70 | 291 |
| 11 | 4.8 | 4750 | 304 | 147 | 451 | 4.7 | 4680 | 238 | 45.6 | 283 | 12.2 | 0.73 | 13.0 | 4.8 | 4530 | 340 | 1.26 | 341 |
| 12 | 4.8 | 4720 | 266 | 122 | 388 | 4.7 | 4640 | 173 | 41.0 | 214 | 12.7 | 0.17 | 12.9 | 4.8 | 4400 | 354 | 3.69 | 358 |
| 13 | 5.0 | 4720 | 262 | 168 | 430 | 4.9 | 4700 | 190 | 54.0 | 244 | 9.22 | 0.42 | 9.64 | 5.0 | 4420 | 316 | 5.85 | 322 |
| 14 | 5.0 | 4660 | 285 | 166 | 451 | 4.8 | 4600 | 184 | 62.8 | 247 | 14.2 | 0.35 | 14.5 | 4.9 | 4420 | 294 | 2.12 | 296 |
| 15 | 5.0 | 4590 | 219 | 215 | 434 | 4.9 | 4600 | 186 | 68.6 | 255 | 23.1 | 2.39 | 25.5 | 4.7 | 4390 | 485 | 3.41 | 488 |
| 16 | 4.9 | 4570 | 197 | 146 | 343 | 4.8 | 4530 | 177 | 69.8 | 247 | 16.3 | 1.54 | 17.8 | 4.8 | 4480 | 295 | 2.61 | 297 |
| 17 | 4.8 | 4730 | 373 | 166 | 539 | 5.0 | 4520 | 166 | 45.4 | 211 | 17.6 | 1.81 | 19.4 | 4.7 | 4410 | 305 | 1.88 | 307 |
| 18 | 4.9 | 4590 | 365 | 140 | 504 | 5.0 | 4500 | 182 | 51.9 | 234 | 20.5 | 1.35 | 21.8 | 4.8 | 4470 | 287 | 2.06 | 289 |
| 19 | 4.9 | 4770 | 275 | 111 | 387 | 5.0 | 4570 | 205 | 57.4 | 263 | 14.7 | 0.80 | 15.6 | 4.8 | 4500 | 204 | 2.21 | 206 |
| 20 | 4.8 | 4660 | 255 | 102 | 357 | 4.8 | 4620 | 218 | 44.5 | 262 | 17.4 | 0.32 | 17.7 | 4.7 | 4400 | 211 | 4.31 | 216 |
| 21 | 4.7 | 4750 | 355 | 119 | 473 | 4.9 | 4660 | 230 | 47.2 | 277 | 15.4 | 0.27 | 15.6 | 4.8 | 4480 | 323 | 1.28 | 324 |
| 22 | 4.9 | 4840 | 345 | 142 | 487 | 4.7 | 4590 | 242 | 55.3 | 297 | 12.7 | 0.67 | 13.4 | 5.0 | 4430 | 210 | 0.91 | 211 |
| 23 | 5.0 | 4780 | 317 | 112 | 430 | 4.9 | 4560 | 254 | 41.6 | 296 | 14.7 | 0.28 | 15.0 | 5.0 | 4420 | 262 | 2.06 | 264 |
| 24 | 5.0 | 4750 | 374 | 116 | 490 | 4.9 | 4610 | 214 | 51.7 | 266 | 10.8 | 0.22 | 11.0 | 5.0 | 4460 | 297 | 2.64 | 299 |
| 25 | 5.0 | 4780 | 360 | 118 | 478 | 4.9 | 4680 | 237 | 68.8 | 306 | 10.9 | 0.35 | 11.2 | 4.9 | 4480 | 332 | 3.22 | 335 |

1 5 g of shot, 100 ml of a solution; 2 2.5 g of each type of shot, 100 ml of a solution; a – dissolved forms, b – suspended forms, c – total cont