## Supplementary material



Рис. S1. Дифрактограмма композита  $CaCu_{3}Ti_{4}O_{12}$ -CuO. Fig. S1. X-ray diffraction pattern of the composite  $CaCu_{3}Ti_{4}O_{12}$ -CuO.



**Рис. 52.** Термограмма титаната кальция-меди (кривые TG [1] и DSC [2]). **Fig. 52.** Thermogram of the sample CaCu<sub>3</sub>Ti<sub>4</sub>O<sub>12</sub>-CuO (TG [1] and DSC [2] curves).

| <b>Табл. S1.</b> Параметры эквивалентных схем, представленных на Рис. 4. |  |
|--|--|
| Table S1. Parameters of the equivalent circuits shown in Fig. 4.         |  |

| T (°C) | R1      | <i>R2</i> (Ω) | $T_{_{CPE1}} \times 10^9$ | P <sub>CPE1</sub> | R3 (kΩ) | $T_{CPEI} \times 10^9$ | P <sub>CPE2</sub> | χ^2 (×10 <sup>-4</sup> ) |
|--------|---------|---------------|---------------------------|-------------------|---------|------------------------|-------------------|--------------------------|
|        |         |               |                           |                   |         |                        |                   |                          |
| 1      | 2       | 3             | 4                         | 5                 | 6       | 7                      | 8                 | 9                        |
| 0      | 200 MΩ  | 327           | 0.287                     | 0.952             | -       | -                      | -                 | 190                      |
| 20     | 120 MΩ  | 224           | 0.345                     | 0.941             | -       | -                      | -                 | 9.34                     |
| 50     | 26.6 MΩ | 118           | 0.471                     | 0.915             | -       | -                      | -                 | 12.8                     |
| 75     | ~       | 74            | 0.577                     | 0.905             | -       | -                      | -                 | 131                      |
| 100    | 18.8 MΩ | 25            | 0.752                     | 0.888             | -       | -                      | -                 | -                        |
| 125    |         | 0             | 1.2                       | 0.866             | 87.4    | 2.10                   | 1                 | 8.47                     |
| 150    | 8.29 MΩ | 0             | 1.67                      | 0.877             | 194.8   | 3.35                   | 0.856             | 18.1                     |
| 175    | 3.98 MΩ | 0             | 2.6                       | 0.857             | 116.8   | 2.87                   | 0.862             | 9.13                     |
| 200    | 1.96 MΩ | 0             | 3.42                      | 0.839             | 45.07   | 3.25                   | 0.864             | 17.6                     |
| 225    | 742 kΩ  | 0             | 4.14                      | 0.813             | 9.814   | 1.26                   | 0.965             | 7.97                     |
| 250    | 240 kΩ  | 0             | 2.43                      | 0.899             | 14.47   | 2.95                   | 0.851             | 3.26                     |
| 275    | 70 kΩ   | 0             | 1.77                      | 0.972             | 14.02   | 2.95                   | 0.835             | 4.40                     |
| 300    | 20.3 kΩ | 0             | 1.77                      | 0.956             | 6.158   | 4.97                   | 0.808             | 2.26                     |
| 325    | 9.17 kΩ | 0             | 1.59                      | 0.969             | 3.097   | 5.00                   | 0.809             | 5.14                     |
| 350    | 3.92 kΩ | 0             | 1.47                      | 0.99              | 1.959   | 4.36                   | 0.817             | 8.52                     |
| 375    | 1.58 kΩ | 0             | 1.39                      | 1                 | 1.180   | 3.16                   | 0.839             | 7.74                     |
| 400    | 694 Ω   | 0             | 1.186                     | 1                 | 0.65    | 7.8                    | 0.787             | 15.3                     |
| 425    | 228 Ω   | 0             | 1.104                     | 1                 | 0.383   | 4.55                   | 0.816             | 1.66                     |
| 450    | -       | -             | -                         | -                 | 0.376   | 1.71                   | 0.869             | 5.49                     |