Supplementary Material

Experimental part

For the synthesis of LSMO, a stoichiometric mixture of La_2O_3, $SrCO_3$, Mn_2O_3 of the composition $La_{0.7}Sr_{0.3}MnO_3$ was prepared. The mixture was kept for 3 h at a temperature of 1150°C. The obtained manganite in the form of LSMO polycrystals was additionally crushed. Thin film polyethylene and a mixture of LSMO and graphite powders layered (20 – 60 layers) was placed in a mold where 1 GPa was pressed. Next, the sample in the mold in the presence of gasoline was held for welding at a temperature above the melting point of polyethylene of 165 –170°C for 60 minutes at low pressure (50 MPa) together with aluminum foil electrodes. After cooling to room temperature, the samples were discs with a diameter of 10 mm and a thickness of 2 mm. The properties of the samples (density, magnetoresistivity, piezoresistivity) synthesized according to the described technology have satisfactory reproducibility. At least 5 samples were synthesized for each composition. Electron microscopy (JEOLJSM6390LA), X-ray diffraction (DRON3M, ARLX'TRA) was used to characterize the samples. Measurements of electrical resistance of a series of samples depending on uniaxial mechanical pressure were carried out using a two-electrode method using digital devices on a calibrated installation with an accuracy of 0.5 kPa. Measurement geometry is current along the pressure direction. The intrinsic electrical resistance of the setup for measuring the piezoresistivity was 50 mΩ. Deviations of electrical resistance from the average values of the series (also for measurements in a constant magnetic field with a strength of up to 15 kOe) did not exceed 6 – 7%. Magnetoresistive properties are measured using electromagnet powered by stabilized electric current. The electrical resistance of the samples was measured using digital instruments.

Table S1. Results of the X-ray diffraction analysis of 15% LDPE/55% C/30% LSMO.

Phase	Space-group	*a*, Å	*b*, Å	*c*, Å	*V*, Å^3	*hkl*	2θ, deg	β, deg	*D*, Å (Particle size)	Degree of crystallinity, %
Polyethylene before the synthesis	Pnam	7.5720	5.0026	2.5606	97.2	110	21.27	0.82	103	55
						200	23.50	1.05	81	
						Average *D*			92	
Polyethylene after the synthesis	Pnam	7.4920	5.0315	2.5238	95.1	110	21.25	0.56	107	90
						200	23.73	0.34	150	
						Average *D*			129	
Graphite	$P6_3/mmc$	2.4581		6.7560	35.4	002	26.54	0.35	244	100
LSMO	$R\bar{3}c$	5.5260		13.3763	353.7	024	46.62	0.44	205	100

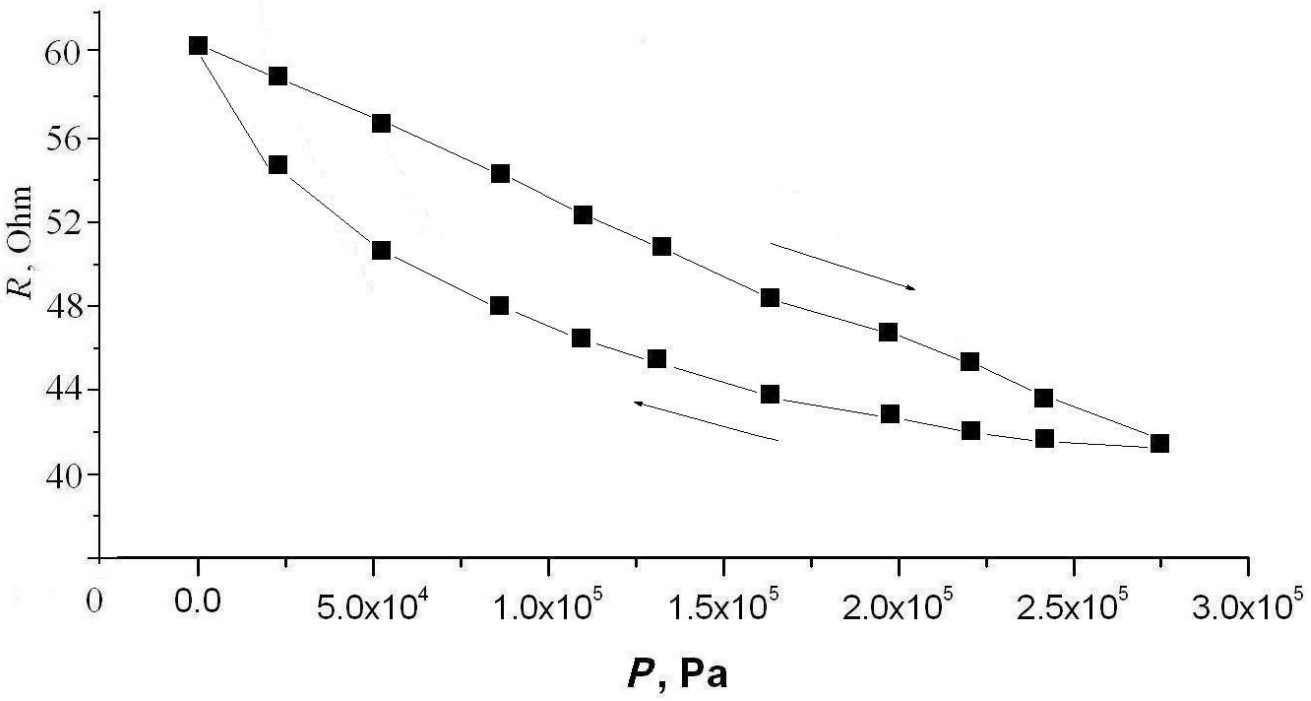

Fig. S1. Pressure dependence of the electrical resistance of the 15% LDPE/80% C/5% LSMO sample, PR = 30%.

https://doi.org/10.22226/2410-3535-2021-4-519-523

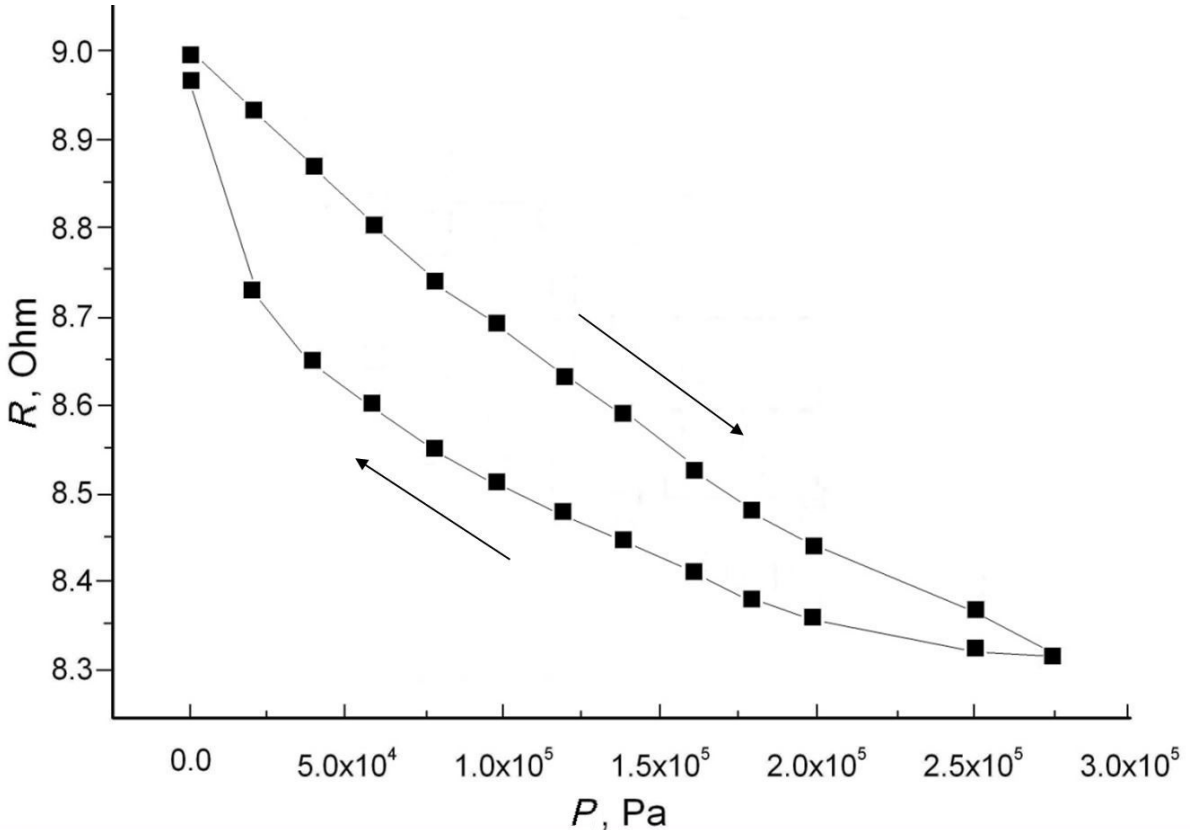

Fig. S2. Pressure dependence of the electrical resistance of the 15% LDPE/65% C/20% LSMO sample, PR = 7.5%.

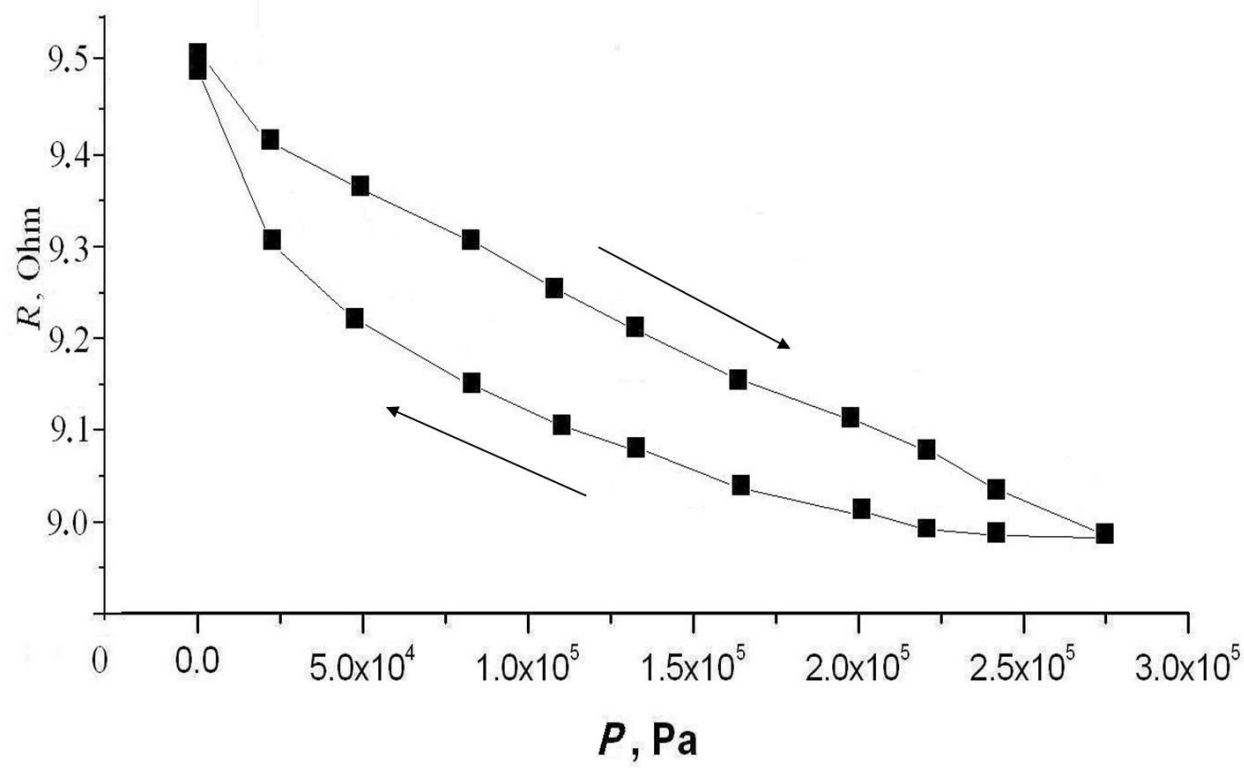

Fig. S3. Pressure dependence of the electrical resistance of the 15% LDPE/60% C/25% LSMO sample, PR = 6.1%.

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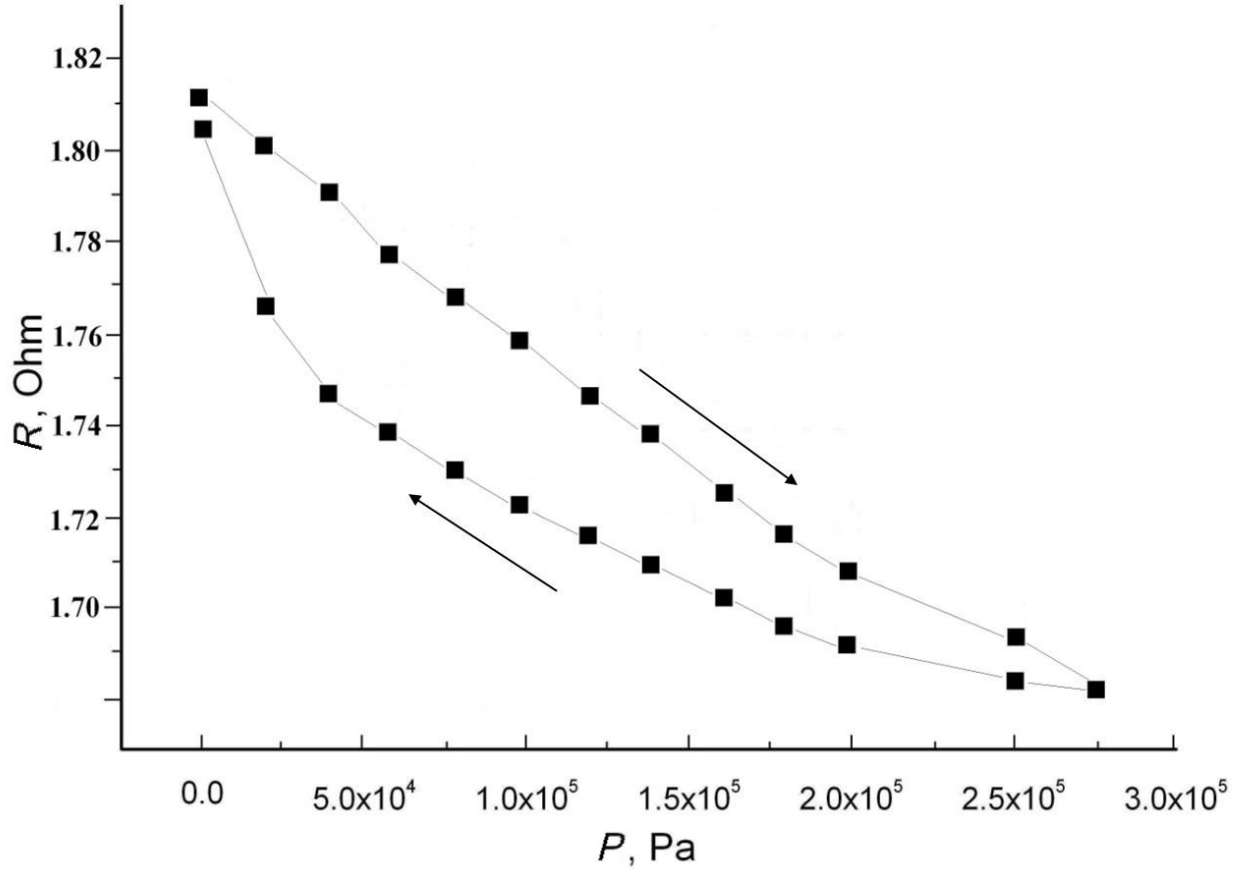

Fig. S4. Pressure dependence of the electrical resistance of the 15% LDPE/55% C/30% LSMO sample, PR = 7.0%.

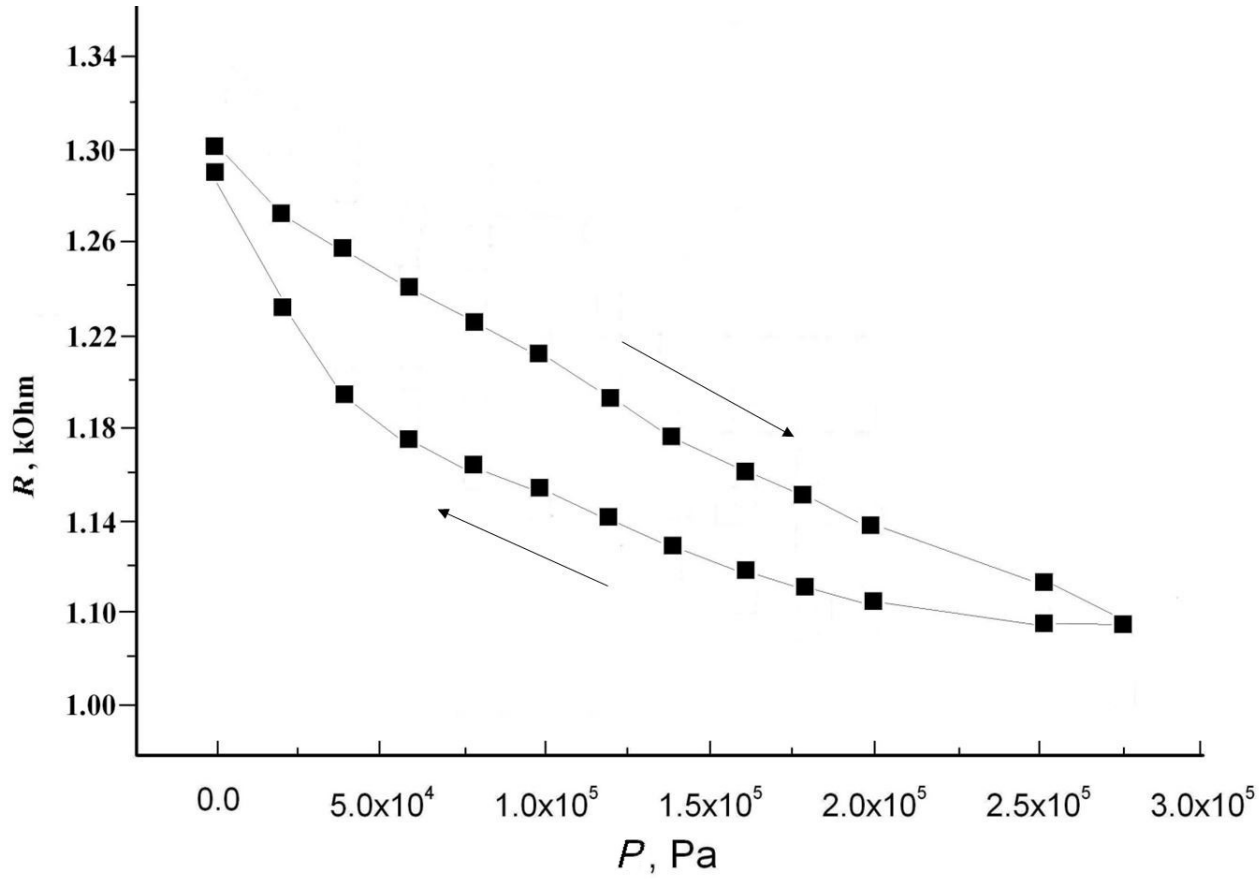

Fig. S5. Pressure dependence of the electrical resistance of the 15% LDPE/15% C/70% LSMO sample, PR = 15.3%.

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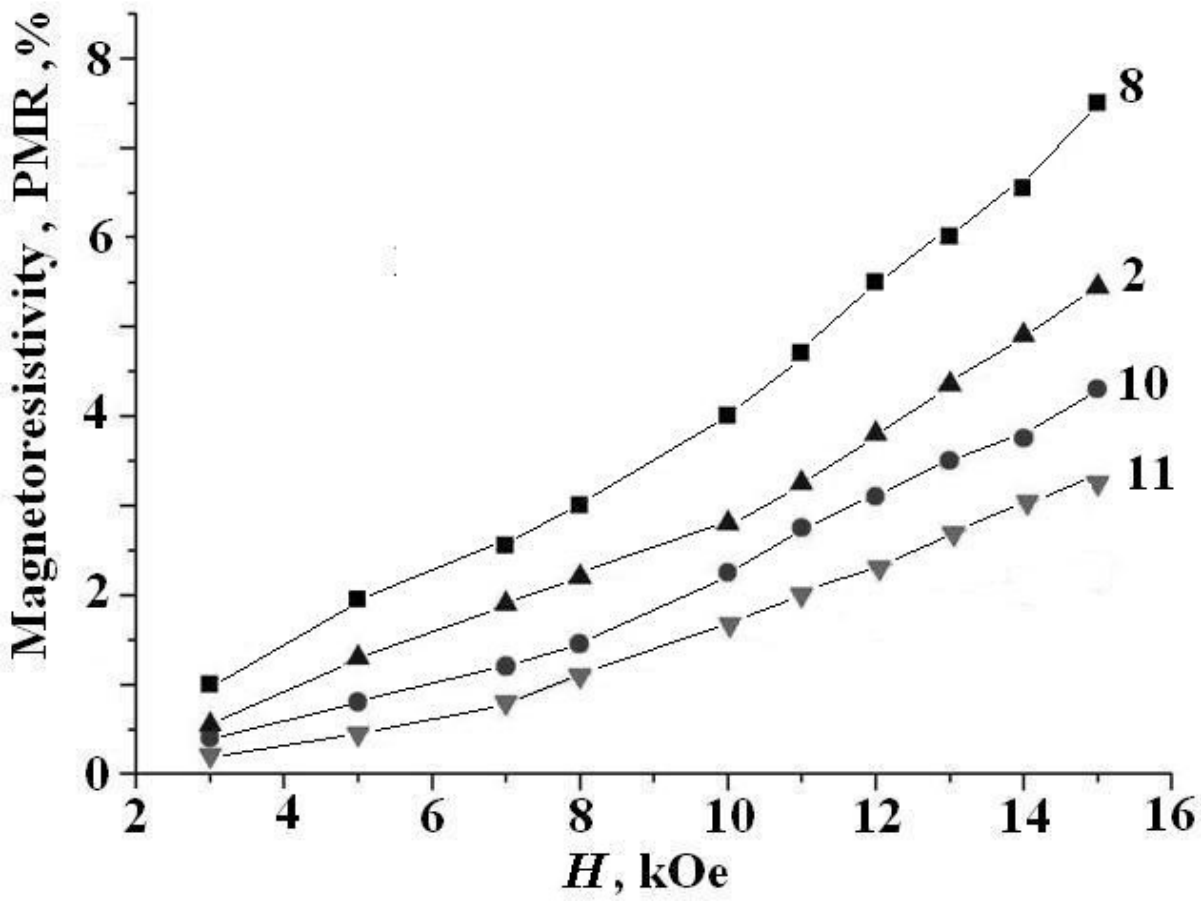

Fig. S6. Magnetoresistivity for a number of samples in constant magnetic field of different strength. Sample numbers correspond to the table in the article text.