than 0.0001% by weight particularly preferably no more than 0.00005% by weight and the content of Zr is preferably no more than 0.0001% by weight

6. The magnesium alloy according to claim 1 or claim 2, characterized in that the individual elements from the group of the rare earths amount to no more than 0.001% by weight, preferably 0.0005% by weight, and still more preferably 0.0003% by weight in the total sum.

7. The magnesium alloy according to any of the preceding claims 1 to 6, characterized in that the alloy has a fine-grained microstructure having a grain size of less than 7.5 µm, and preferably <5 µm, and particularly preferably <2.5 µm, without considerable electrochemical potential differences between the individual matrix phases.

8. The magnesium alloy according to any of claims 1 to 7, characterized in that the intermetallic $Ca_2Mg_6Zn_3$ phase is equally as noble as, or less noble, and the precipitable MgZn phase is more noble, than the matrix phases.

9. The magnesium alloy according to any of the preceding claims 1 to 8, characterized in that the precipitations have a size of <5 µm, and preferably <1 µm, and are dispersely distributed at the grain boundaries or in the grain interior.

10. The magnesium alloy according to any of the preceding claims 1 to 9, characterized in that the alloy has a tensile strength of >275 MPa, and preferably >300 MPa, a yield point of >200 MPa, and preferably >225 MPa, and a yield ratio of <0.8, and preferably <0.75, wherein the difference between the tensile strength and yield point is >50 MPa, and preferably >100 MPa, and the mechanical asymmetry is <1.25.

11. A method for producing a magnesium alloy having improved mechanical and electrochemical properties, comprising the following steps:

a) generating a high-purity magnesium by way of vacuum distillation;

b) generating a billet of the alloy by synthesis of the magnesium according to step a) with high-purity Zn and Ca in a composition of 3 to 7% by weight Zn, 0.001 to 0.5% by weight Ca, the remainder being magnesium containing total impurities, which promote electrochemical potential differences and/or the formation of intermetallic phases, in a amount of no more than 0.0048 by weight wherein the total impurity contains individual impurities selected from the group of Fe, Si, Mn, Co, Ni, Cu, Al, Zr and P in an amount of not more than 0.0038% of weight; and wherein the alloying elements are selected from the group of the rare earths having the ordinal numbers 21, 39, 57 to 71 and 89 to 103 in a total amount of no more than 0.001% by weight;

c) homogenizing the alloy by annealing at a temperature between 350°C and 450°C with a holding period of 4 to 40 hours;

c) at least single forming of the homogenized alloy in the temperature range between 250°C and 350°C; and

d) optionally heat treating the formed alloy in the temperature range between 100°C and 300°C with a holding period of 1 minute to 3 hours.

12. The method according to claim 11, characterized in that the content of Zn is preferably at least 3 to 5% by weight, and the content of Ca is 0.2 to 0.4% by weight.

13. The method according to claim 11 or claim 12, characterized in that the MgZn phase, which is more noble than the alloy matrix, is precipitated from the alloy matrix by the heat treatment and the potential difference that exists between the alloy matrix and the MgZn precipitations is used to adjust the degradation rate of the alloy matrix.

14. The method according to claim 11 or claim 12, characterized in that the grain refining during forming is generated by the intermetallic $Ca_2Mg_6Zn_3$ instead of Zr.

than 0.0001% by weight particularly preferably no more than 0.00005% by weight and the content of Zr is preferably no more than 0.0001% by weight

6. The magnesium alloy according to claim 1 or claim 2, characterized in that the individual elements from the group of the rare earths amount to no more than 0.001% by weight, preferably 0.0005% by weight, and still more preferably 0.0003% by weight in the total sum.

7. The magnesium alloy according to any of the preceding claims 1 to 6, characterized in that the alloy has a fine-grained microstructure having a grain size of less than 7.5 µm, and preferably <5 µm, and particularly preferably <2.5 µm, without electrochemical potential differences between the individual matrix phases.

8. The magnesium alloy according to any of claims 1 to 7, characterized in that the intermetallic $Ca_2Mg_6Zn_3$ phase is equally as noble as, or less noble, and the precipitable MgZn phase is more noble, than the matrix phases.

9. The magnesium alloy according to any of the preceding claims 1 to 8, characterized in that the precipitations have a size of <5 µm, and preferably <1 µm, and are dispersely distributed at the grain boundaries or in the grain interior.

10. The magnesium alloy according to any of the preceding claims 1 to 9, characterized in that the alloy has a tensile strength of >275 MPa, and preferably >300 MPa, a yield point of >200 MPa, and preferably >225 MPa, and a yield ratio of <0.8, and preferably <0.75, wherein the difference between the tensile strength and yield point is >50 MPa, and preferably >100 MPa, and the mechanical asymmetry is <1.25.

11. A method for producing a magnesium alloy having improved mechanical and electrochemical properties, comprising the following steps:

a) generating a high-purity magnesium by way of vacuum distillation;

b) generating a billet of the alloy by synthesis of the magnesium according to step a) with high-purity Zn and Ca in a composition of 3 to 7% by weight Zn, 0.001 to 0.5% by weight Ca, the remainder being magnesium containing total impurities, which promote electrochemical potential differences and/or the formation of intermetallic phases, in a amount of no more than 0.0048% by weight wherein the total impurity contains individual impurities selected from the group of Fe, Si, Mn, Co, Ni, Cu, Al, Zr and P in an amount of not more than 0.0038% of weight; and wherein the alloying elements are selected from the group of the rare earths having the ordinal numbers 21, 39, 57 to 71 and 89 to 103 in a total amount of no more than 0.001% by weight;

c) homogenizing the alloy by annealing at a temperature between 350°C and 450°C with a holding period of 4 to 40 hours;

c) at least single forming of the homogenized alloy in the temperature range between 250°C and 350°C; and

d) optionally heat treating the formed alloy in the temperature range between 100°C and 300°C with a holding period of 1 minute to 3 hours.

12. The method according to claim 11, characterized in that the content of Zn is preferably at least 3 to 5% by weight, and the content of Ca is 0.2 to 0.4% by weight.

13. The method according to claim 11 or claim 12, characterized in that the MgZn phase, which is more noble than the alloy matrix, is precipitated from the alloy matrix by the heat treatment and the potential difference that exists between the alloy matrix and the MgZn precipitations is used to adjust the degradation rate of the alloy matrix.

14. The method according to claim 11 or claim 12, characterized in that the grain refining during forming is generated by the intermetallic $Ca_2Mg_6Zn_3$ instead of Zr.