



Dr. Maria Kalashnikova, D.Sc.

Doctor of Technical Sciences (D.Sc.) · Extractive Metallurgy

Independent Metallurgy Consultant | Subject Matter Expert in
Base & Precious Metals Extraction

📍 Tel Aviv District, Israel (*Global / Remote*)

✉ maria@mkalashnikova.com 📞 +972 55-284-2590

EXECUTIVE SUMMARY

Independent Metallurgy Consultant available for **global EPCM engagements, technical due diligence, and bankable feasibility review**. Over **40 years** of industrial-scale experience de-risking base and precious metals projects — from flowsheet selection and CAPEX optimisation to commissioning support and post-start-up debottlenecking of hydromet refineries and matte smelter integrations.

Trusted technical authority for mining operators, financiers, and EPCM firms requiring an independent reviewer on acid consumption, recovery, scaling, and process-risk assumptions. Operates at the depth required for **NI 43-101 Qualified Person** and **JORC Competent Person** sign-offs on metallurgical test-work, recovery projections, and process plant design. **10 issued patents**, 3 industry textbooks — credibility grounded in delivered industrial outcomes, not theory.

CORE COMPETENCIES & AREAS OF EXPERTISE

▶ Advanced Leaching

HPAL (High-Pressure Acid Leaching), POX (pressure oxidation), atmospheric leaching, laterite leaching

▶ Matte Processing

Matte conversion, copper-nickel matte leaching, treatment of magnetic fractions

▶ Project Evaluation

Nickel laterite scoping study evaluation, technical due diligence, flowsheet auditing, process bottleneck resolution

▶ Separation & Refining

Cobalt SX/EW (Solvent Extraction / Electrowinning), nickel sulphide flotation, non-toxic sulfide precipitation

▶ Precious Metals

PGM recovery from sulfide copper-nickel raw materials and pyrrhotite-pentlandite concentrates

▶ Specialty Chemistry

Thiosulphate precipitants, dissolution kinetics of nickel oxides, sulfide precipitation from dilute sulfate solutions

Independent Technical Consultant / Subject Matter Expert

2014 – Present · Global / Remote

Self-employed · Tel Aviv District, Israel

- **Fenix HPAL Technical Due Diligence (Guatemala / Global): Spearheaded** an independent flowsheet audit of the Skye Resources / Hatch nickel-laterite scoping study, **stress-testing** acid-consumption, recovery, and scaling assumptions on behalf of the financing party — **[insert \$ CAPEX of project audited]** CAPEX scope, surfacing **[insert N]** material risks before FID.
- **Process Optimization — NN Harjavalta (Finland): Diagnosed** throughput bottlenecks across the integrated hydromet refinery and **delivered** targeted precipitation-circuit interventions, lifting base-metal precipitation efficiency by **[insert % uplift]** and adding **[insert tpa or \$ EBITDA]** at zero new CAPEX.
- **Precipitation Advisory — BHP Billiton (Australia): Architected** the technical case for adopting non-toxic Cu/Ni/Co sulfide precipitation from dilute sulfate streams, **cutting** reagent toxicity and tailings load while preserving **[insert % recovery vs. baseline]** metal recovery — patented method RU 2328537.

- **Kola MMC Roasting-Leaching-Electrowinning Circuit: Spearheaded** the 17-year R&D-to-industrial roll-out of the matte-separation flowsheet for the Kola MMC refinery; **optimised** downstream matte conversion, raising cathode nickel purity to **[insert grade %]** and processing **[insert tpa nickel throughput]**.
- **Norilsk Nickel Pyrrhotite Treatment: Developed** and **patented** a full POX (pressure-oxidation) flowsheet that converted low-grade sulfide pyrrhotite — previously a tailings stream — into a profitable feedstock, **unlocking** **[insert tpa nickel-equivalent]** of new annual production.
- **PGM Recovery Optimization: Architected** and scaled the hydrometallurgical PGM-recovery circuit for complex pyrrhotite-pentlandite concentrates, **lifting** PGM recovery by **[insert % uplift vs. prior route]** — basis of patents RU 2444573 and RU 2573306.
- **Laterite & Polymetallic Ore Processing (Bulgaria & Kazakhstan): Engineered** a custom laterite leach profile for Bulgarian deposits and **delivered** a bespoke atmospheric/pressure flowsheet for sub-standard Pb-Zn concentrates (Zhairem, Kazakhstan) — **bypassing** traditional smelter limitations and recovering **[insert % Zn / Pb / Ag]**.
- **Magnetic Fraction Processing (Kola MMC): Designed** a leaching-plus-nickel-sulphide-flotation methodology to liberate base metals trapped in the magnetic fraction of fine mattes, **improving** overall plant recovery by **[insert % overall plant recovery uplift]**.

CONSULTATIVE & ADVISORY ROLES

- **Subject Matter Expert (SME) & Technical Advisor:** Providing high-level metallurgical strategy for global engineering firms (EPCM) and mining operators.
- **Independent Reviewer:** Auditing feasibility studies, scoping studies, and metallurgical test-work programs to ensure compliance with international financing standards.
- **Expert Competence:** Operating at the technical depth required for NI 43-101 QP and JORC Competent Person reporting, specifically in the domains of metallurgical test-work, recovery projections, and process plant design for base and precious metals.

1. **RU 2114195** Method of processing sulfide pyrrhotite-containing raw materials. (1998)
2. **RU 2167101** Method of producing thiosulphates. (2001)
3. **RU 2182183** Method of precipitating non-ferrous metals from solutions. (2002)
4. **RU 2328537** Method of selective precipitation of nickel, cobalt and copper from zinc in sulfate solutions in the form of sulfides. (2008)
5. **RU 2319754** Method of processing materials containing minerals in which nickel is in the oxide form. (2008)
6. **RU 2444573** Method for producing precious metals concentrate from sulfide copper-nickel raw materials. (2012)
7. **RU 2573306** Method of processing sulfide pyrrhotite-pentlandite concentrates containing precious metals. (2016)
8. **RU 2601722** Method of processing solutions containing non-ferrous metals. (2016)
9. **RU 2626257** Method of processing sulfide pyrrhotite-pentlandite concentrates containing precious metals. (2017)
10. **RU 2712160** Method of processing sulfide concentrate containing pyrrhotite, pyrite, chalcopyrite, pentlandite, and precious metals. (2020)

Author of

3 fundamental textbooks

and numerous international symposium papers on hydrometallurgy of non-ferrous metals.

Books

1. S.S. Naboychenko, Ya.M. Shneerson, M.I. Kalashnikova, L.V. Chugaev. *Pressure Hydrometallurgy of Non-Ferrous Metals*, Vol. 1. UGTU-UPI, Yekaterinburg, 2008 (376 pp.)
2. S.S. Naboychenko, Ya.M. Shneerson, M.I. Kalashnikova, L.V. Chugaev. *Pressure Hydrometallurgy of Non-Ferrous Metals*, Vol. 2. UGTU-UPI, Yekaterinburg, 2009 (612 pp.)
3. M.I. Kalashnikova. *Scientific Basics of Modern Nickel and Copper Hydrometallurgy*. LAP LAMBERT Academic Publishing, 2011 (368 pp.)

Selected International Symposium Papers

1. Shneerson, Ryabko, Volkov, Muravin, Kalashnikova. *Wasteless hydrometallurgical technology for matte treatment*. Clean Technology for the Mining Industry, University of Concepción, Chile, 1996, pp. 323–331.
2. Kalashnikova, Shneerson, Keskinova, Chetvertakov. *Non-Toxic Method of Nickel/Cobalt/Copper Sulfides Precipitation as Rich Concentrates from Diluted Sulfate Solutions*. Yazawa International Symposium, San Diego, USA, 2003.
3. Kalashnikova, Shneerson, Keskinova. *Interactions of ferriferous copper-nickel mattes with sulphuric acid: study of chemistry and kinetics*. Pressure Hydrometallurgy 2004, Alberta, Canada, pp. 887–898.
4. Kalashnikova, Shneerson, Keskinova, Chetvertakov. *Non-Traditional Methods of Heavy Metals Precipitation from Solution in the Form of Sulfide*. Sohn International Symposium, San Diego, USA, 2006, pp. 555–561.
5. Kalashnikova, Shneerson, Lapin, Saltykov, Keskinova. *Hydrometallurgical Treatment of Substandard Pb–Zn Concentrates with Production of Zinc, Lead and Silver*. Sohn International Symposium, San Diego, USA, 2006, pp. 573–579.
6. Volkov, Kalashnikova, Shneerson. *The behaviour of copper during the dissolution of metallic nickel in CuSO₄ solutions*. Copper / Cobre 2007, John E. Dutrizac Symposium on Copper Hydrometallurgy, Toronto, Canada, pp. 333–343.
7. Volkov, Kalashnikova. *Mechanism of nickel oxides dissolving by sulphuric acid solutions in acid environment*. Non-Ferrous Metals, 2011, №2, pp. 68–71.