# Joint Press Release

## BASF and Moleaer™ partner to combine novel technologies in the field of mining to enhance copper recovery at existing mines

- **BASF and Moleaer announce strategic partnership combining chemical, mineral processing, gas transfer, and nanobubble technology expertise for the Mining Industry**
- **Global demand for copper is estimated to double by 2035, requiring new mines, mine expansions and technological improvements at existing mines to increase output**
- **BASF's chemical LixTRA™ leaching aid combined with Moleaer's innovative nanobubble technology provides a significant increase in copper recovery for the heap leaching of primary sulfide ores**
- **Other areas within the field of mineral extraction are being investigated for synergies between BASF's mining reagents and Moleaer's nanobubble technology**

**Ludwigshafen, Germany / Hawthorne, California, USA; November 8, 2022** – Global chemical company BASF and Moleaer™ Inc., the global leader in nanobubble technology, today announced an exclusive partnership. This partnership will combine expertise in mineral processing, hydrometallurgy, gas transfer, and nanobubble technology to develop innovative processes for mining. The initial aim is to target the copper leaching process and improve extraction rates of copper ores containing high levels of chalcopyrite, which have historically been difficult to leach.

The demand for copper is expected to increase significantly, as it is an essential raw material for driving the electric revolution. This will play a key role as an enabler to decarbonizing the global economy. According to a report released in July by S&P Global Market Intelligence, the annual demand for copper is projected to reach 50 million metric

tons by 2035, from the current 25 million metric tons today. The study also finds a potential copper deficit of as much as 10 million metric tons.

As existing mines deplete their resources, higher demand will require new mines. In addition, ore grades are declining, ore mineralogy is becoming more complex, and ESG (Environmental, Social and Governance) responsibilities are increasing. The result is that new mines are taking longer and longer to come to fruition. Therefore, maximizing the recovery of copper from existing reserves has never been more crucial.

Copper is extracted from primary sulfide ores through a flotation process and low-grade ores are traditionally discarded because they are too costly to process. Currently, an alternative hydrometallurgical heap leach process is employed for low grade oxide and secondary sulfide ores. It is, however, very difficult to leach primary sulfide ores, such as chalcopyrite, which leads to low recovery efficiencies.

Based on test work conducted by BASF, Moleaer's nanobubble technology improves the extraction process of valuable metals such as copper. When combined with BASF's LixTRA™ reagent, the mineral recovery rates and efficiencies are compounded, especially in sulfide-based ores such as chalcopyrite, which have historically been challenging to leach effectively.

Caren Hoffman, who leads the global mining solutions business at BASF, states: "Technological improvements and collaborations like the one we announced today are essential if the industry is to maximize the recovery of copper at existing mines. By combining BASF's LixTRA reagent, allowing greater ore-lixiviant contact, together with Moleaer's nanobubble technology to facilitate a higher oxidative environment, we offer technology to the industry to significantly increase copper recoveries."

Nick Dyner, CEO of Moleaer, added: "We look forward to working with BASF, a global leader in mineral extraction chemistry, to improve the recovery of copper and help support the green economy. This important collaboration comes at a time when the ability of mining copper is only getting more costly and challenging. Moleaer's nanobubble technology will allow the mining industry to improve the efficiency and efficacy in existing mines and narrow the gap between supply and demand of copper."

**About BASF mining solutions**

With innovative products, global field support and industry leading technical expertise, BASF mining solutions provides sustainable solutions which increase productivity, recovery and flexibility throughout the hydrometallurgical process of mining operations in leaching, solvent extraction, flotation, solid/liquid separation and tailings management. Further information can be found at www.mining-solutions.basf.com

BASF mining solutions is part of BASF's Performance Chemicals division. The division's portfolio also includes fuel and lubricant solutions, plastic additives, as well as oilfield chemicals. Customers from a variety of industries including Chemicals, Plastics, Consumer Goods, Energy & Resources and Automotive & Transportation benefit from our innovative solutions. To learn more, visit www.performancechemicals.basf.com

**About BASF**

At BASF, we create chemistry for a sustainable future. We combine economic success with environmental protection and social responsibility. Around 111,000 employees in the BASF Group contribute to the success of our customers in nearly all sectors and almost every country in the world. Our portfolio comprises six segments: Chemicals, Materials, Industrial Solutions, Surface Technologies, Nutrition & Care and Agricultural Solutions. BASF generated sales of €78.6 billion in 2021. BASF shares are traded on the stock exchange in Frankfurt (BAS) and as American Depositary Receipts (BASFY) in the U.S. Further information at www.basf.com.

**About Moleaer**

Moleaer™ is the leading nanobubble technology company with over 2,000 nanobubble generator installations in more than 42 countries. The company deploys the unique power of nanobubbles to enhance and improve the performance and productivity of many of the world's most critical industrial processes, unlocking the power of water to help farmers grow more food, empower businesses to manage their water needs more effectively and efficiently, and restore aquatic ecosystems sustainably without added chemicals.

Nanobubbles, which are 2,500 times smaller than a grain of salt, allow the scarce resource of water do more with less. They supersaturate water with oxygen, form natural oxidants for disinfection, improve plant health, and increase water's ability to permeate soil and rock. Moleaer's patented nanobubble technology also provides the highest oxygen transfer rate in the aeration and gas infusion industry, with an efficiency of more than 85 percent per foot of water. Its nanobubble generators are a cost-effective, chemical-free solution proven to increase sustainable food production, reduce the use of chemicals, restore aquatic ecosystems, and improve natural resource recovery. Moleaer technology has been validated by extensive research and renown universities.

To learn more, visit: www.Moleaer.com

**BASF Media Contact**
Laraine Kruger
Phone: +27 11 203-2633
laraine.kruger@basf.com

**Moleaer Media Contact**
Juanita Gutierrez
Phone: +1 310-622-8235
jgutierrez@finprofiles.com