*Physicochem. Probl. Miner. Process., 58(5), 2022, 156579*

http://www.journalssystem.com/ppmp

Physicochemical Problems of Mineral Processing

ISSN 1643-1049


# Honorary note: Mehmet Sabri Çelik

Professor Mehmet Sabri Çelik was born in 1954 in Van, Türkiye. He graduated from Istanbul Technical University as a mining engineer in 1974 and received a Turkish Ministry of education scholarship to study MS and Ph.D. in the USA. He continued his MS studies on grinding of coals with the advisor L.G. Austin in mineral processing at Pennsylvania State University and graduated in 1977. He developed a great curiosity with the flotation course lectured by the late Dr. Frank F. Aplan and Interfacial Phenomena course given by Dr. Richard Hogg. Through the material covered in these courses, he discovered the true love that will shape his academic career. During the search for a Ph.D. advisor, he came across a young talented scientist Prof. Somasundaran at Columbia University to whom he asked for admission to Henry Krumb School of Mines. He spent four and half years with this fantastic group and learned the beauty of surface and colloid chemistry-based processes. Columbia in this respect was like a great temple for people starving to flotation and adsorption. Adsorption love started with his Ph.D. thesis on adsorption and precipitation mechanisms of anionic surfactants and polymers onto reservoir rocks during Enhanced Oil recovery (EOR). After his Ph.D. degree, he had to decide between staying in the USA or Türkiye or somewhere abroad. Despite a very good job offer by Pall Filter company, he decided to take an Academic job at KF University of Petroleum and Minerals where he continued to conduct research in a line similar to his Ph.D. thesis except on Saudi Arabian reservoirs. He has not had much chance to work on mineral processing problems but mainly on surface and colloid chemistry aspects of EOR until he ended his 5 years of Academic work (1983-1988) with an associate professor degree and a job offer by RH Yoon as a visiting associate professor in Virginia Polytechnic Institute&SU. During 1988-1989 Prof. Çelik in VPI&SU got involved in a variety of problems including selective flotation of pyrite from coal and issues related to the adsorption of nonionic surfactants on coal. He shared the same calorimetry lab with Zhenghe Xu then a brilliant Ph.D. student now at the University of Alberta.

While in VPI&SU Prof. Çelik made the greatest decision in his academic life and took a position at Istanbul Technical University (ITU), Mineral Processing department where he refurnished the surface and colloid chemistry lab and started working on the flotation of industrial minerals. His first and longest passion was boron minerals which he studied the flotation mechanisms of a series of boron minerals starting from least soluble colemanite to moderately soluble ulexite and most soluble borax. This endeavor intersected his destiny with Prof. J.D. Miller of the University of Utah. Their bilateral collaboration through NSF-TUBITAK projects led to many fruitful avenues including faculty and student exchange not only in the area of flotation of soluble boron minerals but also in that of trona. All these endeavors resulted in many high-quality papers, grants, and patents.

Prof. Çelik later got involved in the flotation of feldspar minerals but mainly that of selective Separation of Na-feldspar (albite) from K-Feldspar (microcline) and produced some great papers. One of his main interests all along was to produce value-added added products out of industrial minerals, particularly those of clay minerals. This highlighted the development of some 12 types of industrial products on a pilot scale out of sepiolite, zeolite, and bentonite with a group of over 40 researchers. Apart from the surface and colloid Chemistry lab, he furnished a complete rheology and clay/mineral-based product development lab including a unique paint technology lab to develop unique products from boron, feldspar, bentonite, zeolite, calcite, trona, alunite, and sepiolite in the area of paint, plastic,

DOI: 10.37190/ppmp/156579

insulation, and paper. Later dry cleaning of low-rank Turkish coals took three years of his intense research until it resulted in some very good separation methodologies for low-rank coals. During these, he also took consultancy work (2017-2018) for Etimaden on the Beylikova thorium/rare earth oxides project where he worked on the process flowsheet development, particularly on the flotation of REM.

All these efforts were also instrumental in later taking administrative jobs, e.g. board member with Eti Mining in 1997, board member (2003-2007), and board chair (2007-2010) in the national Boron Research Institute which was highlighting positions apart from his academic life. An administrative job offer came in 2012-2016 as a vice-rector of Istanbul Technical University (ITU) position in charge of research and technoparks. This gave him great opportunities to test his idea of forming inter-disciplinary umbrella research groups in specialized areas; he further tested his idea as a rector at Harran University from 2019 till the present.

In ITU Mineral Processing Department, he supervised 19 Ph.D., and 21 MS theses out of which a total of 39 students were employed 16 in academia or research institutes, and the rest in the industry. He made it a principal duty to spread his experience in national and international areas. In this context, Prof. Çelik completed 41 large-scale fundamentals and applied research projects where he diversified multidisciplinary approaches of research techniques to convey a message of attracting his students to academic or industrial research. Throughout his life, he has worked with high-caliber experts in mineral processing/surface and colloid chemistry or has sent his students to their labs or received scientists from abroad to raise awareness of international collaboration and likewise propagate his country's interests. In his research endeavor, systematically understanding the mechanisms of his study area and delving into the scientific depth of the applied field have been the main driving force of his academic life.

Prof. Çelik is the recipient of many awards but the most notable ones are TÜBİTAK Junior Researcher Award given in 1994 and TÜBİTAK Science Award given in 2021. He has collected 7590 cites/H49 and 4505 cites/H37 based on Google Scholars (https://bit.ly/3UVHRmJ) and Web of Science indicators.

**Selected refereed publications in cited journals:**


1. AUSTIN, L.G., BAGGA, P., and **ÇELIK, M.S.**, 1981. *Breakage properties of some materials in laboratory ball mills*, Powder Technology, 28, 235-243.
2. **ÇELIK, M.S.** and SOMASUNDARAN, P., 1986. *The effect of multivalent ions on the flotation of coal*, Separation Science and Technology, 21, 393-402.
3. **ÇELIK, M.S.** and SOMASUNDARAN, P., 1988. *Effect of chain length on dissolution of calcium sulfonate precipitates*, Journal of Colloid and Interface Science, 122, 163-170.
4. SOMASUNDARAN, P., ANANTHAPADMANABHAN, K.P. and **ÇELIK, M.S.**, 1988. *Precipitation-redissolution phenomena in sulfonate-$AlCl_3$ system*, Langmuir, 4, 1061-1063.
5. **ÇELIK, M.S.**, 1989. *Adsorption of ethoxylated sulfonate and nonionic homologs on coal*, Journal of Colloid and Interface Science, 129, 428-440.
6. **ÇELIK, M.S.**, 1989. *Effect of ultrasonic treatment on the flotation of coal and galena*, Separation Science and Technology, 24, 1159-1166.
7. **ÇELIK, M.S.** and YOON, R.H., 1991. *Adsorption of poly-oxyethylene nonylphenol homologues on a low-ash coal*, Langmuir, 7, 1770-1774.
8. **ÇELIK, M.S.**, UZUNOGLU, A., and ARSLAN, F., 1994. *Decrepitation properties of some boron minerals*, Powder Technology, 79, 167-172.
9. **ÇELIK, M.S.** and YASAR, E., 1995. *Electrokinetic properties of some hydrated boron minerals*, Journal of Colloid and Interface Science, 173, 181-185.
10. **ÇELIK, M.S.** and SEYHAN, K., 1995. *Effect of heat treatment on the flotation of Turkish lignites*, Coal Preparation, 16, 65-79.
11. **ÇELIK, M.S.**, YASAR, E. and EL-SHALL, H., 1998. *Flotation of heterocoagulated particulates in ulexite/SDS/electrolyte system*, Journal of Colloid and Interface Science, 203, 254-259.
12. BATAR, T., KAHRAMAN, B., CIRIT, E., **ÇELIK, M.S.**, 1998. *Dry processing of borax by calcination as an alternative to wet methods*, International Journal of Mineral Processing, 54, 99-110.
13. **ÇELIK, M.S.**, CAN, İ., EREN, R.H., 1998. *Removal of titanium impurities from feldspar ores by new flotation collectors*, Minerals Engineering, 11, 1209-1218.

**14.** GÜNEY, A., ÖNAL, G., **ÇELIK, M.S.**, 1999. *A new flowsheet for processing chromite fines by column and the collector adsorption mechanism*, Minerals Engineering, 12, 1041-1049.
**15.** ATESOK, G., **ÇELIK, M.S.**, 2000. *A new flotation scheme for a difficult-to-float coal using pitch additive in dry grinding*, Fuel, 79, 1509-1513.
**16.** **ÇELIK, M.S.**, YILDIRIM, I., 2000. *A new physical process for desulfurization of low-rank coals*, Fuel, 79, 1665-1669.
**17.** HANÇER, M., **ÇELIK, M.S.**, MILLER, J.D., 2001. *The significance of interfacial water structure in soluble salt flotation systems*, Journal of Colloid and Interface Science, 235, 150-161.
**18.** ATEŞOK, G., BOYLU, F., **ÇELIK, M.S.**, 2001. *Carrier flotation for desulfurization and deashing of difficult-to-float coals*, Minerals Engineering, 14, 661-670.
**19.** DEMIR, C, ABRAMOV, A.A. and **ÇELIK, M.S.**, 2001. *Flotation separation of Na-feldspar from K-feldspar by monovalent salts*, Minerals Engineering, 14, 733-740.
**20.** SABAH, E. and **ÇELIK, M.S.**, 2002. *Adsorption mechanism of quaternary amines by sepiolite*, Separation Science and Technology, 37, 3081-3097.
**21.** SABAH, E., **ÇELIK, M.S.**, 2002. *Interaction of pyridine derivatives with sepiolite*, Journal of Colloid Interface Science, 251, 33-38.
**22.** ERSOY, B., **ÇELIK, M.S.**, 2002. *Electrokinetic properties of clinoptilolite*, Microporous and Meso Porous Materials", 55, 305-312.
**23.** KARA, M., YUZER, H., SABAH, E., **ÇELIK, M.S.**, 2003. *Adsorption of cobalt from aqueous solution onto sepiolite*, Water Research, 37, 224-232.
**24.** TURAN, M., **ÇELIK, M.S.**, 2003. *Regenerability of Turkish clinoptilolite for use in ammonia removal from drinking water*, Journal of Water Supply: Research and Technology-AQUA, 52, 59-66.
**25.** ÖZCAN, Ö., **ÇELIK, M.S.**, ZHORRO, N, MILLER, J.D., 2003. *Effect of thermal stability on the flotation response of sodium carbonate salts*, Minerals Engineering, 16, 353-358.
**26.** DEMIR, C., GÜLGÖNÜL, İ., **ÇELIK, M.S.**, 2003. *Differential separation of albite from microcline by monovalent salts in HF medium*, Minerals and Metallurgical Processing, 20, 120-124.
**27.** ÖZDEMIR, O., ARMAĞAN, B., TURAN, M., **ÇELIK, M.S.**, 2004. *Comparison of the adsorption characteristics of azo-reactive dyes on mesoporous minerals*, Dyes and Pigments, 62, 49-60.
**28.** SABAH, E., YÜZER, H. and **ÇELIK, M.S.**, 2004. *Characterization and dewatering of fine coal tailings by dual-flocculant systems*, International Journal of Mineral Processing, 74, 303-315.
**29.** BENKLI, Y.E., CAN, M.F., TURAN, M., **ÇELIK, M.S**., 2005. *Modification of organo-zeolite surface for the removal of reactive azo dyes in fixed-bed reactors*, Water Research, 39(2-3): 487-493.
**30.** KARAGÜZEL, C., CAN, M.F., SÖNMEZ, E., **ÇELIK, M.S.**, 2005. *Effect of electrolyte on surface free energy components of feldspar minerals using thin-layer wicking method*, Journal of Colloid and Interface Science, 285, 192-200.
**31.** SABAH, E., **ÇELIK, M.S.**, 2005. *Sepiolite: An effective bleaching adsorbent for the physical refining of degummed rapeseed oil*, Journal of American Oil Chemical Society (JAOCS), 82, 911-916.
**32.** KARAGÜZEL, C., GÜLGONUL, İ., DEMIR, C., ÇINAR, M., **ÇELIK, M.S.**, 2006. *Concentration of K-feldspar from a pegmatitic feldspar ore by flotation*, International Journal of Mineral Processing, 81, 122-132.
**33.** UYANIK, N, ERDEM, A.R., CAN, M.F., **ÇELIK, M.S.**, 2006. *Epoxy nanocomposites curing by microwaves*, Polymer Engineering Science, 46(8): 1104-1110.
**34.** SABAH, E, ÇINAR, M, **ÇELIK, M.S.**, 2007. *Decolorization of vegetable oils: Adsorption mechanism of beta-carotene on acid-activated sepiolite*, Food Chemistry, 100, 1661-1668.
**35.** GULGONUL, I., KARAGUZEL, C., **ÇELIK, M.S.**, 2008. *Surface vs. bulk analyses of various feldspars and their significance to flotation*, International Journal of Mineral Processing, 86(1-4), 68-74.
**36.** ÇINAR, M., SABAH, E., **ÇELIK, M.S.**, 2009. *Rheological properties of sepiolite ground in acid and alkaline media*, Applied Clay Science, 42(3-4), 422–426.
**37.** OZDEMIR, O., KARAGUZEL, C., NGUYEN, A.V., **ÇELIK, M.S.**, MILLER, J.D., 2009. *Contact angle and bubble attachment studies in the flotation of trona and other soluble carbonate salts*, Minerals Engineering, 22(2), 168-175.
**38.** BULUT, G., CHIMEDDORJ, M., ESENLI, F., **ÇELIK, M.S.**, 2009. *Production of desiccants from Turkish bentonites*, Applied Clay Science, 46(2), 141-147.

**39.** ÇETINEL, T., KARAGÜZEL. C., BOYLU, F., **ÇELIK, M.S.**, 2010. *Activation of (Na, Ca)-bentonites with soda and MgO and their utilization as drilling mud*, Applied Clay Science, 48(3), 398-404.

**40.** BOYLU, F., CINKU, K., ESENLI, F., **CELIK, M.S.**, 2010. *The separation efficiency of Na-bentonite by hydrocyclone and characterization of hydrocyclone products*, International Journal of Mineral Processing, 94(3-4), 196-202.

**41.** ÖZDEMIR, O., GUPTA, V., MILLER, J.D., CINAR, M., **ÇELIK, M.S.**, 2011. *Production of trona concentrates using high-intensity dry magnetic separation followed by flotation*, Minerals & Metallurgical Processing, 28(2), 55-61.

**42.** ÇINAR, M., ERSEVER, G., ŞAHBAZ, O., **ÇELIK, M.S.**, 2011. *Sepiolite/calcium interactions in desiccant clay production*, Applied Clay Science, 53(3), 386-394.

**43.** KARAKAŞ, F., **ÇELIK, M.S.**, 2012. *Effect of quantity and size distribution of calcite filler on the quality of water borne paints*, Progress in Organic Coatings, 74, 555–563.

**44.** BOYLU, F., HOJIYEV, R., ERSEVER, G., ULCAY, Y., **ÇELIK, M.S.**, 2012. *Production of ultrapure bentonite clays through centrifugation techniques*, Separation Science and Technology, 47:6, 842-849.

**45.** KARAKAŞ, F., **ÇELIK, M.S.**, 2013. *Mechanism of $TiO_2$ stabilization by low molecular weight NaPAA in reference to water-borne paint suspensions*, Colloids and Surfaces A: Physicochemical Engineering Aspects, 434, 185-193.

**46.** GHORBANI, F., YOUNESI, H., MEHRABAN, Z., **ÇELIK, M.S.**, GHOREYSHI, A.S., ANBIA, M., 2013. *Preparation and characterization of highly pure silica from sedge as agricultural waste and its utilization in the synthesis of mesoporous silica MCM-41*, Journal of the Taiwan Institute of Chemical Engineers, 44, 821–828.

**47.** GÜVEN, O., KARAKAŞ, F., KAYA, M.A., YILDIRIM, H., **ÇELIK, M.S.**, 2014. *Composite films based on styrene-co-butyl-acrylate with colemanite and calcium bentonite mineral fillers*, Mechanics of Composite Materials, 50(3), 335-342.

**48.** HASSAS, B.V., KARAKAŞ, F., **ÇELIK, M.S.**, 2014. *Ultrafine coal dewatering: Relationship between hydrophilic lipophilic balance (HLB) of surfactants and coal rank*, International Journal of Mineral Processing, 133, 97-104.

**49.** GÜVEN, O., ÖZDEMIR, O., KARAAĞAÇLIOĞLU, İ.E., **ÇELIK, M.S.**, 2015. *Surface morphologies and floatability of sand-blasted quartz particles*, Minerals Engineering, 70, 1-7.

**50.** GUVEN, O., **ÇELIK, M.S.**, DRELICH, J.W., 2015. *Flotation of methylated roughened glass particles and analysis of particle–bubble energy barrier*, Minerals Engineering, 79, 125-132.

**51.** HASSAS, B.V., CALISKAN, H., GÜVEN, O., KARAKAS, F., CINAR, M., **CELIK, M.S.**, 2016. *Effect of roughness and shape factor on flotation characteristics of glass beads*, Colloids and Surfaces A: Physicochemical Engineering Aspects, 492, 88–99.

**52.** HOJIYEV, R., ULCAY, Y., HOJAMBERDIEV, M., **ÇELIK, M.S.**, CARTY, W.M., 2017. *Hydrophobicity and polymer compatibility of POSS-modified Wyoming Na-montmorillonite for developing polymer-clay nanocomposites*, Journal of Colloid and Interface Science, 497, 393–401.

**53.** HOJIYEV, R., ULCAY, Y., **ÇELIK, M.S.**, CARTY, W.M., 2017. *Effect of CEC coverage of hexadecyltributylphosphonium modified montmorillonite on polymer compatibility*, Applied Clay Science, 141, 204–211.

**54.** KARATAS, D., TEKIN, A., BAHADORI, F., **ÇELIK, M.S.**, 2017. *Interaction of curcumin in a drug delivery system including a composite with poly(lactic-co-glycolic acid) and montmorillonite: a density functional theory and molecular dynamics study*, Journal of Materials Chemistry B, 5(40), 8070-8082.

**55.** HASSANZADEH, A., FIROUZI M., ALBIJANIC, B., **ÇELIK, M.S.**, 2018. *A review on determination of particle–bubble encounter using analytical, experimental and numerical methods*, Minerals Engineering, 122, 296-311.

**56.** KARAKAŞ, F. and **ÇELIK, M.S**., 2018. *Stabilization mechanism of main paint pigments*, Progress in Organic Coatings, 123, 292–298.

**57.** HASSANZADEH, A., AZIZI, A., KOUACHI, S., KARIMI, M., **ÇELIK, M.S.**, 2019. *Estimation of flotation rate constant and particle-bubble interactions considering key hydrodynamic parameters and their interrelations*, Minerals Engineering, 141, 1-18.

**58.** KOCA, R.B., GÜVEN, O., **ÇELIK, M.S.**, and FIRATLI, E., 2020. *Wetting properties of blood lipid fractions on different titanium surfaces*, International Journal of Implant Dentistry, 6, 16-23.

**59.** GÜVEN, O., SERDENGEÇTI, T., TUNÇ, B., ÖZDEMIR, O., KARAAĞAÇLIOĞLU, İ.E., **ÇELIK, M.S.**, 2020. *Effect of particle shape properties on selective separation of chromite from serpentine by flotation*, Physicochemical Problems of Mineral Processing, 56(5), 818–828.
**60.** GÜVEN, O., BATJARGAL, K., ÖZDEMIR, O., KARAKASHEV, S.I., GROZEV, N.A., BOYLU, F., **ÇELIK, M.S.**, 2020. *Experimental procedure for the determination of the critical coalescence concentration (CCC) of simple frothers*, Minerals, 10, 617-629.
**61.** KARAKASHEV, S., GROZEV, I., NIKOLAY A., BATJARGAL, K., GÜVEN, O., ÖZDEMIR, O., BOYLU, F., **ÇELIK, M.S.**, 2020. *Correlations for easy calculation of the critical coalescence concentration (CCC) of simple frothers*, Coatings, 10, 612-624.
**62.** HOJIYEV, R., ULCAY, Y., **ÇELIK, M.S.**, 2020. *Poly(ethylene terephthalate)-clay nanocomposite multifilament yarn: Physical and thermal properties*, Polymer Science - Series A, 62(4), 392–406.
**63.** UYSAL, T., GÜVEN, O., ÖZDEMIR, O., KARAAĞAÇLIOĞLU, İ.E., TUNÇ, B., **ÇELIK, M.S.**, 2021. *Contribution of particle morphology on flotation and aggregation of sphalerite particles*, Minerals Engineering, 165.
**64.** BATJARGAL, K., GÜVEN, O., OZDEMIR, O., KARAKASHEV, S.I., GROZEV, N.A., BOYLU, F., **ÇELIK, M.S.**, 2021. *Adsorption kinetics of various frothers on rising bubbles of different sizes under flotation conditions*, Minerals, 11(3), 304-320.
**65.** HASSAS, B.V., GÜVEN, O., BAŞTÜRKÇÜ, E., **ÇELIK, M.S.**, 2021. *Morphological changes of glass bead particles upon an abrasive blasting as characterized by settling and flotation experiments*, Physicochemical Problems of Mineral Processing, 57(2), 157-168.
**66.** KARAKASHEV, S.I., GROZEV, N.A., ÖZDEMIR, O., BATJARGAL, K., GUVEN, O., ATA, S., BOURNIVAL, G., BOYLU, F., **ÇELIK, M.S.**, 2021. *On the frother's strength and its performance*, Minerals Engineering, 171.
**67.** KARAAĞAÇLIOĞLU, İ.E., KARATAŞ, D., ÖZYILDIRIM, Ö., **ÇELIK, M.S.**, 2022. *Investigation of the interactions of arsenic with gangue minerals in colemanite calcination*, Microporous and Mesoporous Materials, 333, 111735.
**68.** KARATAS, D., BAHADORI, F., TEKIN, A., KIZILCAY, G.E., **CELIK, M.S.**, 2022. *Enhancing the kinetic stability of polymeric nanomicelles (PLGA) using nano-montmorillonite for effective targeting of cancer tumors*, The Journal of Physical Chemistry B, 126(2), 463-479.

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