Crystal structures of the selected cathinones

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The popularity of new psychoactive substances has increased significantly in recent years; many new compounds appear on the market every year. Among the drugs with a stimulating effect, the most popular group are cathinone derivatives. These substances are becoming more and more popular, especially among young people who treat them as an alternative to illegal substances and use them recreationally. This leads to a number of health risks for users of these substances.

The market for new psychoactive substances includes many groups of chemical compounds. According to the European Early Warning System, around 398 new psychoactive substances were monitored at the end of 2024 and more than 200 previously reported substances were detected in Europe [1].

Synthetic cathinones comprise a widespread group of compounds that have been present on the legal highs market for years, but subsequent chemical modifications make them an analytical challenge for toxicologists, doctors and law enforcement officers. Synthetic cathinones are similar to amphetamines; the only difference between synthetic cathinone and the corresponding amphetamine is the presence (in the cathinone) of a carbonyl group at the β position with respect to the amino group. For this reason, synthetic cathinones are called β–keto-amphetamines. Since cathinone is a β–ketone derivative of amphetamine, it has a stimulating and sympathomimetic effect on the central nervous system.

The studied samples were provided by a law enforcement agency as materials seized from the illicit drug market. Various derivatives of cathinones were analysed by different methods including single crystal X-ray crystallography [2,3,4,5]. Selected compounds will be presented on the poster.

[1] https://www.unodc.org/LSS/Page/NPS/DataVisualisations

[2] Kuś, P., Kusz, J., Książek, M. & Rojkiewicz, M. (2025). *Acta Cryst.* **C81**, 252.

[3] Rojkiewicz, M., Kuś, P., Kusz, J., Książek, M. & Staszek, D. (2023). *Crystals* **13**, 934.

[4] Rojkiewicz, M., Kuś, P., Książek, M. & Kusz, J. (2022). *Acta Cryst.* **C78**, 56.

[5] Rojkiewicz, M., Kuś, P., Kusz, J., Książek, M. & Sochanik, A. (2020). *Forensic Toxicology* **38**, 481.