

## **Carbon dot–MOF composites for cancer biomarker detection: an emerging research frontier**

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### **Abstract**

Cancer is a deadly disease that has become a major global concern. Early detection of cancer biomarkers is crucial to significantly reduce the impact and enable the prompt diagnosis and effective treatment of cancer. The integration of carbon dots (CDs) with metal–organic frameworks (MOFs) has emerged as a promising approach for developing highly selective and sensitive sensors for cancer biomarker detection. CD@MOF composites exhibit remarkable properties due to the synergy between the exceptional optical characteristics of CDs and the unique surface features of MOFs. With the improved properties, such as high surface area, tunable porosity, excellent photoluminescence, and biocompatibility, that these composites possess, they serve as ideal candidates for cancer biomarker sensing. This review dissects the chemistry of CDs and MOFs, and explores recent advancements in CD@MOF-based strategies in the detection of several cancer biomarkers, highlighting their potential as ultrasensitive probes for clinical applications. It also delineates the challenges in the development and future directions in the application of CD@MOF composites as sensors for cancer biomarkers.